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AGGREGATE RESOURCE MANAGEMENT PROPOSALS FOR LAND USE PLANNING WITHIN THE SOUTH INTERLAKE PLANNING DISTRICT

compiled by
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Winnipeg, 1982

The data presented in this report has been compiled from several sources. The recommendations contained within are intended as an aid for land use planning and are not to be regarded as a final interpretation of the mineral resources of the area.

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SUMMARY

Aggregate sources within the South Interlake Planning District are derived from glaciofluvial deposits, beach ridges, and near-surface dolomite bedrock. Naturally occurring gravel within the District totals 33.0 million tonnes, and is concentrated primarily within the Rural Municipality of Rockwood.

There are sufficient reserves of sand and gravel, and crushed dolomite for future mining in excess of 25 years. The production of aggregate from crushed dolomite exceeds production from naturally occurring sources.

Detailed recommendations are presented with respect to the proposed planning status for each aggregate deposit and near surface bedrock deposit. It is recommended that no new development take place on deposits designated with a "Stop" status, until the resource has been depleted and the site rehabilitated. Further consultation is required for those deposits allocated a "Caution" status.

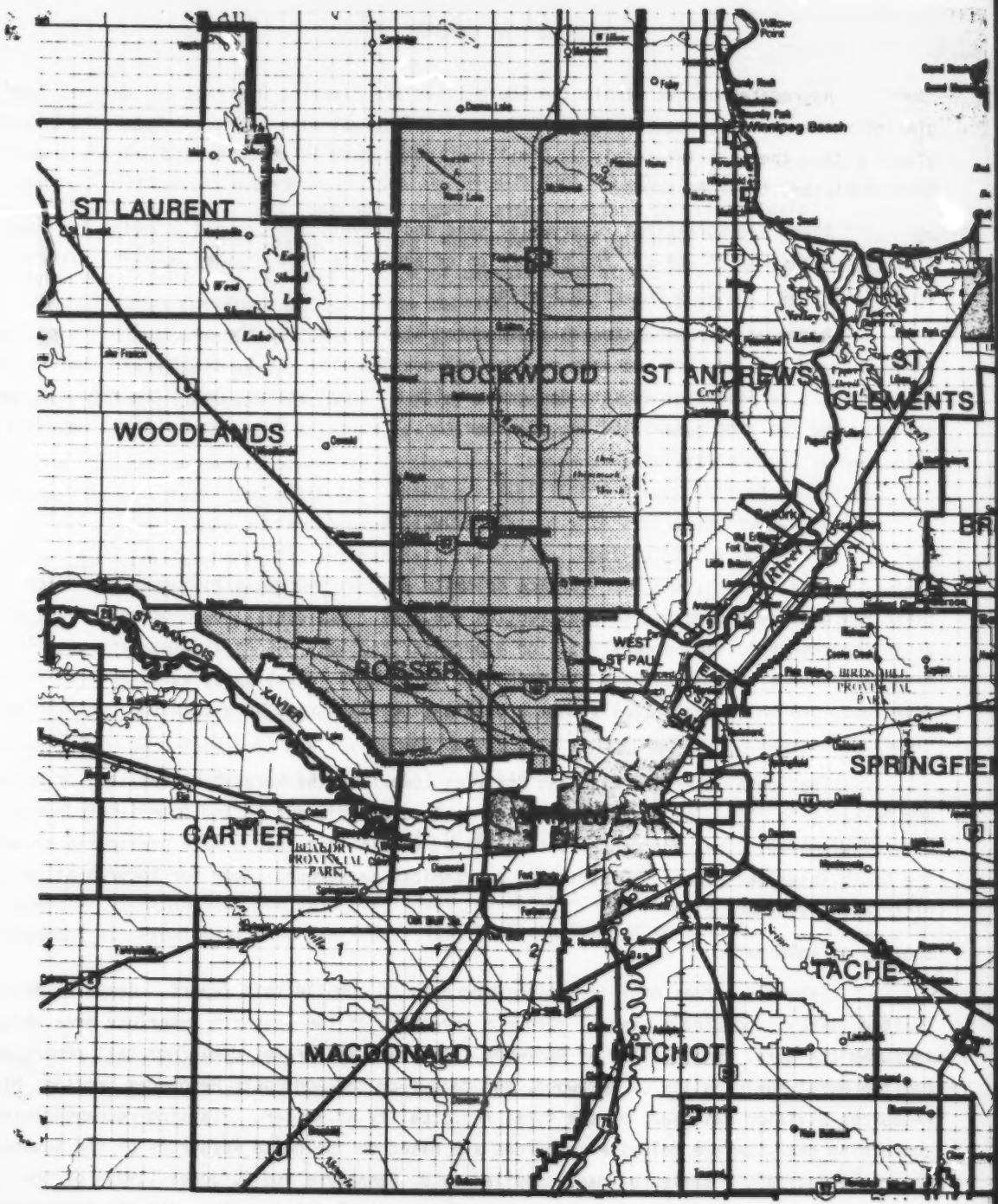
INTRODUCTION

Sand, gravel, and near-surface dolomite are non-renewable resources which are the basic raw materials used by the construction industry. Residential development around expanding urban centres are often in conflict with mineral extraction. As an aid for land use planning, mineral resource recommendations are presented to protect valuable aggregate mineral resources from land uses which would conflict or prohibit mineral extraction within the South Interlake Planning District.

The South Interlake Planning District comprises the Rural Municipalitis of Rockwood and Rosser (Fig. 1). The planning district is located adjacent to and immediately north of the City of Winnipeg. The recommendations contained within this report were previously presented to the South Interlake Planning District as a technical background study for incorporation into the district development plan.

Sources of Information

Several sources of information were used to compile this report. James F. McLaren Limited (1980) conducted a mineral resource inventory of the Southern Interlake area which included the Rural Municipality of Rockwood. The sand and gravel data from that report was used for the Rural Municipality of Rockwood, and data from the Aggregate Resources Section, Mineral Resources Division was used for the Rural Municipality of Rosser. Planning recommendations concerning near-surface dolomite resources are based on "Dolomite Resources of the Southern Interlake Region", a series of maps compiled by B. Bannatyne and C. Jones (1979) of the Mineral Resources Division. Computerized sand and gravel data on file with the Aggregate Resources Section, and Mineral Resources Inventory Cards on file with the Mineral Resources Division were also used.



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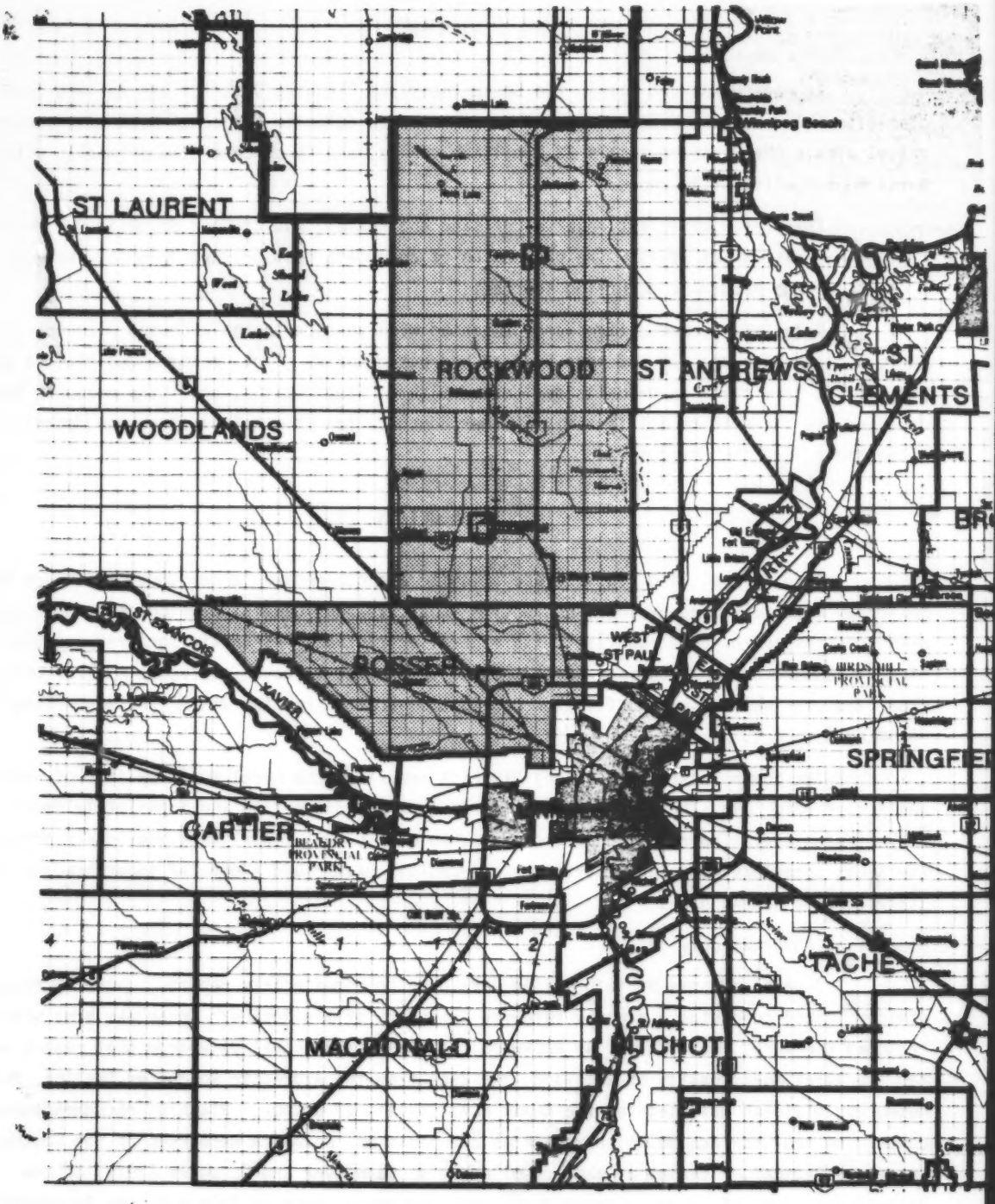


Figure 1. South Interlake Planning District.

AGGREGATE RESOURCES

Introduction

Aggregate resources within the content of this report refer to sand, gravel and near-surface dolomite. Potential sources of aggregate in the Winnipeg area are shown in Figure 2. Although there would appear to be sufficient reserves of aggregate, the deposits are not evenly distributed throughout the area. The quality and remaining reserves of each deposit are variable. The aggregate resources are also finite. When economically viable sources close to the Winnipeg market become depleted or unavailable (due to constraints such as residential buildings) the aggregate industry must acquire alternate sources of raw materials, often farther from the intended markets. Regions which lack an adequate supply of aggregate require a program of planning which will protect deposits for ongoing and future development.

Planning activities must be based on an accurate evaluation of what resources are available and an estimate of what resources will be required. Planning activities should also recognize mineral extraction as an interim land use such that after mineral extraction has ceased, the mine site can be rehabilitated and the land returned to an alternate land use.

Origin of Sand and Gravel

Glaciofluvial and beach ridge deposits are the dominant surficial geologic features in the study area. The evolution of the surficial geology is relatively simplistic, comprised of till plains overlain by lacustrine deposits formed during the recession of glacial Lake Agassiz. The till plains are gently undulating and composed of reworked till overlying an undisturbed calcareous till.

Overlying the till plains is a thin mantle of lacustrine sediment composed of clay and silt. The overlying mantle is uniformly found within the South Interlake Planning District, except on the near-surface bedrock highs at Stony Mountain and Stonewall.

The sand and gravel deposits within the study area form a pattern of beach ridges and glaciofluvial features relating to the presence of former glacial Lake Agassiz.

During the last glacial episode, the South Interlake Planning District was inundated by ice up to 2000 m in thickness. Till, a stone, sand, silt and clay mixture, was deposited at the base of the glacier. As the ice receded, the glacier impounded the natural drainage of the meltwater forming glacial Lake Agassiz to depths of 200 m. During the late stages of the lake, the water level gradually lowered and the higher land levels emerged.

The action of the lake water, generated by wind and currents, sorted the till, creating sand and gravel beaches with characteristic sand bars and spits along the shoreline, and washing the finer silt and clay into the deeper portions of the lake. Sand and gravel was also deposited along the streambeds which flowed directly into glacial Lake Agassiz.

Based upon relative location and elevation, the shoreline of the various stages of glacial Lake Agassiz have been traced. For example, beach deposits 4530, 4548 and 4549 (refer

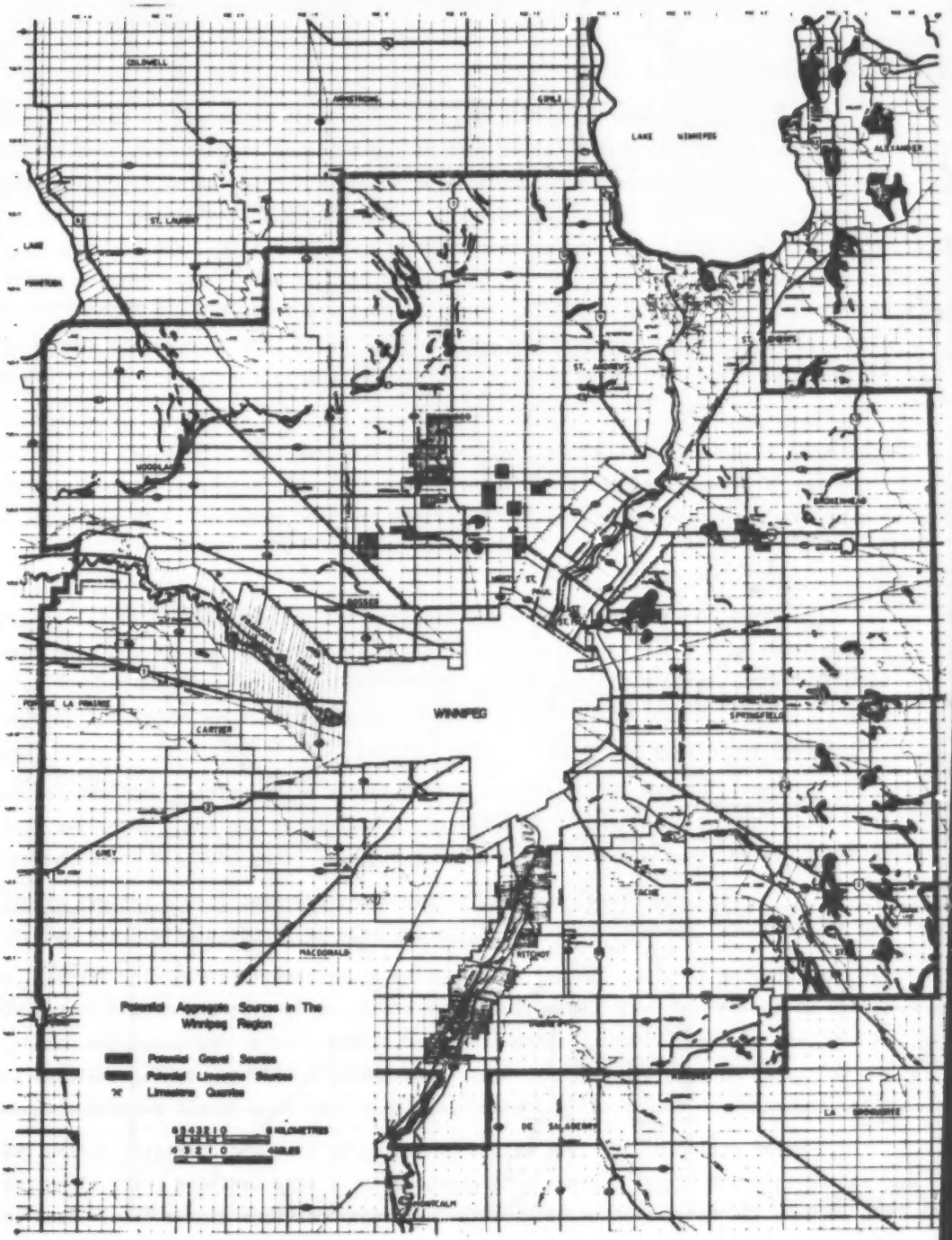


Figure 2. Potential aggregate sources in the Winnipeg region.

to Map 1 - in pocket) represent three successive levels of glacial Lake Agassiz. The western beach ridge (4530) represents the highest level at 267 m a.s.l. (875 ft.). The intermediate ridge (deposits 4548 and 4540) represents a lower level at about 251 m a.s.l. (825 ft.) and the easternmost beaches (deposits 4549 and 4520) are remnants of the latest and lowest level of glacial Lake Agassiz in this area at 244 m a.s.l. (800 ft.).

Distribution of Sand and Gravel Deposits

The sand and gravel deposits are confined to beach ridge and glaciofluvial features. The beach ridges trend in a north-south direction corresponding to the levels of glacial Lake Agassiz, with the glaciofluvial features intersecting the beach ridges in a north-west to south-east direction. This trend is well illustrated by the glaciofluvial deposits 4531, 4532, 4537, 4533, 4534, 4535 and 4536, intersecting the linear beach ridge deposit 4530. Several glaciofluvial deposits not intersecting beach ridges are found in the Stonewall area, specifically deposits 4520 (Fig. 3 and 4) 4518, 4527, 4526 as well as deposit 4554 north of Teulon.

Generally, the stratigraphy of the sand and gravel deposits is a shallow sandy pebbly gravel overlying a clayey till. The beach deposits tend to exhibit characteristic horizontal beach bedding, while the glaciofluvial deposits exhibit more variable stratigraphy, ranging from unsorted sand and gravel to graded bedding.

The glaciofluvial deposits are characterized as low relief ridges. The variable sedimentary structure is due to the reduced sorting action resulting from short transport distances and small contributing drainage basins. The beach ridges are perhaps one of the more characteristic geomorphic features within the planning district. The beach ridges appear as narrow, long, low ridges, and closely follow topographic contours.

Near-Surface Bedrock

The primary source of aggregate within the South Interlake Planning District is derived from the quarrying and crushing of the near-surface dolomite bedrock. Several active quarries presently produce an average of 996 600 tonnes of aggregate annually.

The regional and near-surface bedrock geology is illustrated on Map 2 (in pocket). A succession of sedimentary formations trend approximately in a north-south direction, ranging in depth below surface from less than 3 m to over 40 m.

The Stony Mountain Formation of Ordovician age is found primarily in the centre of the planning district and overlies the Red River Formation which is found in the eastern portion of the planning district. Dolomite of the Stonewall Formation, of Ordovician and Silurian age, overlies the Stony Mountain Formation. It in turn is overlain by dolomite of the Silurian age Interlake Group found along the western edge of the planning district.

Dependent upon the specific geology of each formation member, the suitability of each member for potential aggregate production has been generalized and presented as Table 1.

Figure 3. Airphoto mosaic (1:31 680) showing mined portions of glaciofluvial deposit 4520 within the Rural Municipality of Rockwood.

Figure 4. Ground view of mined portion of deposit 4520 at LS5-5-13-2 E.P.M. Farm buildings on top of the deposit prohibit mineral extraction.

TABLE 1

Suitability of Bedrock for Aggregate Production

Formation	Member	Potential Aggregate Quality
Interlake Group		High
Stonewall		High
Stony Mountain -	Williams	Low
	Gunton	High
	Penitentiary	Medium
	Gunn	Low
Red River	Fort Garry (upper)	Medium-High
	Fort Garry (lower)	Medium
	Selkirk	Low

SUPPLY AND DEMAND

Supply of Aggregate

Estimated reserves of sand and gravel for each deposit are shown in Table 2. Total reserves within the planning district are 33.0 million tonnes; 32.4 million tonnes within the Rural Municipality of Rockwood and 0.6 million tonnes within the Rural Municipality of Rosser. Potential reserves of near-surface dolomite (overburden less than 3 m) were calculated based on an average quarry depth of 3 m. Potential reserves of dolomite equal 171.2 million tonnes; 126.6 million tonnes within the Rural Municipality of Rockwood and 44.6 million tonnes within the Rural Municipality of Rosser. A summary of potential aggregate reserves is shown in Tables 3 and 4.

Within the Rural Municipality of Rosser, there is only one sand and gravel deposit, 337, which is actively being mined. Deposit 365 has previously been mined to depletion and the pit is rehabilitated. There are two former quarries located within the municipality. The Little Stony Mountain Quarry (27 and 34-11-2 E.P.M.) was formerly operated by the City of Winnipeg until 1905. The quarry site is currently rehabilitated and is part of a park (Fig. 5). The Lilyfield Quarry (28-12-2 E.P.M.) was operated by the Winnipeg Supply and Fuel Company Limited and has been abandoned since 1967.

An estimated 98% of all naturally occurring sand and gravel is located within the Rural Municipality of Rockwood. Existing sand and gravel pits supply regional markets and no sand and gravel is exported to the Winnipeg market. Within the municipality, there are seven active limestone quarries, two within Stony Mountain and five quarries located 4 km northeast of Stonewall (Fig. 6 and 7).

TABLE 2

SAND AND GRAVEL RESOURCES IN THE R.M. OF ROCKWOOD

(tonnes)

DEPOSIT NUMBER (SEE MAP)	MATERIAL CONTENT	DEPOSIT TYPE	QUALITY	RESERVE ESTIMATE	RECOMMENDED PLANNING STATUS	COMMENTS
4518	Sandy fine gravel, some till	Fluvial	Medium-low	1 620 500	Stop	4 pits; 2 active; past Department of Highways use; 2 naturally reclaimed with water
4519	Sand and fine gravel	Beach	Low	16 700	Caution	2 pits; past Highways use
4520	Sandy coarse gravel and stone	Beach	Medium	1 186 700	Stop	16 pits; some commercial, some farmyard; past Highways use
4521	Unsorted sand and gravel	Beach	Low	44 900	Go	Shallow gravel (0.3 m) over till
4522	Sand and gravel	Beach	Low	85 400	Caution	Commercial pits; adjacent to quarries
4524	Sand and gravel	Beach	Medium	193 600	Caution	Commercial pits; adjacent to quarries
4525	Sand and gravel	Fluvial	Medium	136 600	Caution	No pits; near quarries
4526	Fine sand to coarse pebbles	Fluvial	Medium-high	897 600	Stop	Active pit in western part of deposit; past Highways use
4527	Sandy coarse gravel	Fluvial	Medium-high	535 900	Stop	Deep pit, not presently active; past Highways use
4530	Sandy coarse gravel	Beach	Medium	12 069 600	Caution	Some commercial pits; some farmyard pits; past Highways use
4531	Sand and pebbles	Fluvial	Medium-high	274 900	Caution	1 farmyard pit
4532	Sandy pebble gravel	Fluvial	Medium-high	1 931 100	Caution	Shallow deposit (1.2 m) over till; part Crown
4533	Sandy coarse pebble gravel	Fluvial	Medium-high	2 144 500	Stop	Good quality; 5 active pits; past Highways use
4534	Coarse gravel	Fluvial	Medium-high	752 400	Caution	Shallow, good quality deposit; 1 active pit
4535	Sand and	Fluvial	Medium-low	930 200	Go	Very sandy; shallow (0.5 m) over till

DEPOSIT NUMBER (SEE MAP)	MATERIAL CONTENT	DEPOSIT TYPE	QUALITY	RESERVE ESTIMATE	RECOMMENDED PLANNING STATUS	COMMENTS
4536	Sand and gravel	Fluvial	Medium-low	661 800	Go	
4537	Gravelly sand	Fluvial	Low	109 100	Go	
4538	Sand and gravel	Beach	Low	8 200	Go	Garbage dump
4539	Sandy coarse gravel	Beach	Medium	166 400	Caution	
4540	Sandy fine gravel	Beach	Low	2 717 100	Caution	Shallow in east (0.3 m)
4541	Sand and gravel	Beach	Low	49 300	Go	
4542	Sandy fine gravel	Beach	Medium-low	19 800	Caution	Part Crown; past Highways uses; require rehabilitation
4543	Sand and gravel	Beach	Low	78 600	Go	
4544	Sand and gravel	Beach	Medium	15 800	Caution	
4545	Sand and gravel	Beach	Medium	286 900	Caution	
4546	Sand and gravel	Beach	Low	32 200	Go	
4547	Sandy coarse gravel	Beach	Medium	267 500	Caution	
4548	Sand and pebbles	Beach	Medium	1 687 800	Caution	1 deep water-filled pit
4549	Sand and gravel	Beach	Low	264 000	Go	
4550	Sand and gravel	Fluvial	Medium	269 300	Caution	
4551	Sand and gravel	Beach	Low	130 200	Go	
4552	Sand and gravel	Beach	Low	281 600	Go	
4553	Sand and gravel	Beach	Low	193 600	Go	
4554	Fine pebble gravel	Fluvial	Medium-high	510 400	Caution	Good quality; old test pits
4555	Sand and gravel	Beach	Low	114 100	Go	
4556	Sand and gravel	Beach	Low	57 000	Go	
4557	Gravelly sand	Beach	Low	43 700	Go	
4558	Sand and gravel	Fluvial	Low	156 600	Go	
4559	Gravelly sand	Beach	Low	5 300	Go	Part Crown
45560	Sand and gravel	Beach	Low	14 100	Go	

DEPOSIT NUMBER (SEE MAP)	MATERIAL CONTENT	DEPOSIT TYPE	QUALITY	RESERVE ESTIMATE	RECOMMENDED PLANNING STATUS	COMMENTS
4561	Sand and gravel	Beach	Low	7 000	Go	
4562	Sand and gravel	Beach	Medium	118 800	Caution	Komarno
4564	Sand and gravel	Beach	Low	17 600	Go	
4565	Sand and gravel	Beach	Low	202 400	Caution	
4567	Sandy fine gravel	Beach	Medium	1 140 800	Caution	2 active pits
			Total Reserves	32 437 600		

SAND AND GRAVEL RESOURCES IN THE R.M. OF ROSSER

(tonnes)

337	Gravelly sand	Beach ridge	Low	633 600	Caution/ Go	Mined to water table in part
365	Gravelly sand	Beach ridge	Low	-	Go	Mined to depletion, partially re-habilitated
			Total Reserves	633 600		

TABLE 3

Estimated Reserves of Sand and Gravel by Quality
(tonnes)

Quality	Rural Municipality	
	Rockwood	Rosser
Low	4 618 700	633 600
Medium-Low	3 232 300	-
Medium	17 539 800	-
Medium-High	7 046 800	-
Total	32 437 600	633 600
Total	33 071 200	

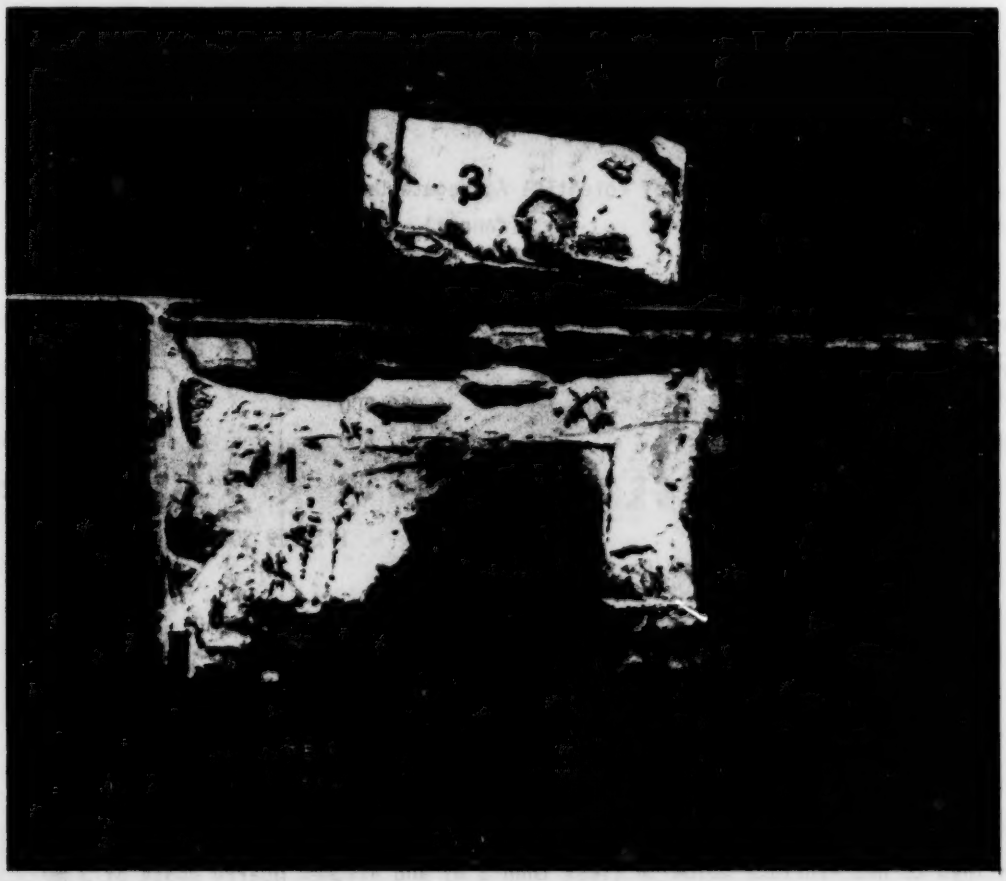
TABLE 4

Estimated Reserves of Potential Aggregate Derived from Crushed Dolomite*
(tonnes)

Quality	Rural Municipality	
	Rockwood	Rosser
Low	9 592 000	831 600
Medium	4 050 500	-
High	112 997 600	43 797 600
Total	126 640 100	44 629 200
Total	171 269 300	

*Confined to near-surface dolomite (less than 3 m) and assumed quarry depth of 3 m.

Figure 5. Rehabilitated portion of the Little Stony Mountain Quarry currently used as a park.



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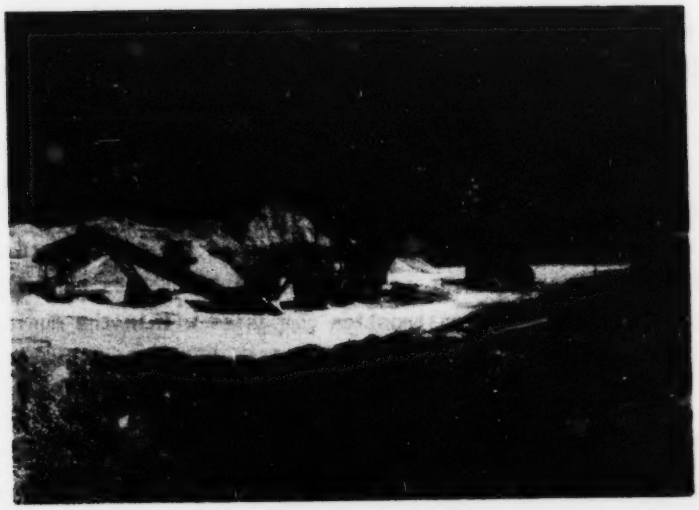

Figure 7. Active quarry operation northeast of Stonewall (33-13-2 E.P.M.).

Demand for Aggregate

Estimation of the demand for aggregate was derived from consideration of:

i) Department of Highways upgrading and improvements,
ii) requirements of the Rural Municipality of Rockwood and Rosser, and
iii) construction requirements of private concrete and aggregate suppliers.

Within the Rural Municipality of Rockwood, future highway improvements include the continuation of the upgrading of P.T.H. #7 to a four lane facility between P.T.H. 101 (Perimeter Highway) to P.T.H. 67, as well as the upgrading of P.T.H. 67 through and east of Stonewall. The Department of Highways estimates their annual demand for sand and gravel to be 23 900 tonnes, and the Rural Municipality of Rockwood utilizes 34 000 tonnes annually. Private construction companies and aggregate suppliers purchase the majority of their aggregate from local quarries, but an estimated 9000 tonnes is mined annually from existing gravel deposits.

The beach and glaciofluvial deposits have not all been mined to depletion due to the shallow depth, short lateral extent, and considerable stripping required. However, the greatest production of aggregate is derived from the crushing of the dolomite bedrock in the Stony Mountain and Stonewall area. The Department of Highways utilizes some 22 600 tonnes of crushed dolomite annually. Private consumption for the local construction industry and aggregate suppliers is estimated at 13 600 tonnes annually. The greatest demand for crushed dolomite is the City of Winnipeg market which consumes an estimated 960 300 tonnes annually. Of the annual crushed dolomite production of 996 600 tonnes, approximately 36 200 tonnes or 3% of the total production is consumed within the Rural Municipality of Rockwood.

The demand for aggregate within the Rural Municipality of Rosser is less than the demand within the Rural Municipality of Rockwood. Future highway improvements include the continuation of upgrading of P.T.H. No. 6. With the anticipated upgrading of the Easterville Road, greater importance will be placed upon P.T.H. No. 6 as an alternate route from Winnipeg to The Pas. The Department of Highways last removed aggregate from pits located at N.W. 17-12-1 E.P.M. in 1976 when 367 500 tonnes of "B" base material were mined. An annual estimated removal of 10 000 tonnes is assumed to represent demand for the Department of Highways. The Rural Municipality of Rosser utilizes an estimated 27 300 tonnes annually for road maintenance. There are no private concrete or construction companies within the municipality which consume aggregate. No aggregate from within the municipality is supplied to the City of Winnipeg market.

Supply vs Demand for Aggregate

Estimated demand for aggregate for a 1 and 25 year period is shown in Table 5, and a comparison between supply and demand is shown in Table 6. A comparison of supply and demand shows that there are 33.0 million tonnes of naturally occurring sand and gravel of various quality, with a projected annual demand of 104 300 tonnes. Although the supply is sufficient for the next 25 years, (specifically, the supply will equal demand in 317 years), an estimated 98% of all naturally occurring sand and gravel is located within the Rural Municipality of Rockwood.

Demand for crushed dolomite is currently 1 100 900 tonnes annually; with an estimated supply of 204 340 500 tonnes, there are sufficient reserves in excess of 25 years.

At current rate of consumption, the supply of crushed dolomite will last an estimated 185 years. The Rural Municipality of Rockwood presently supplies 100% of all the crushed dolomite, but 35% of known dolomite reserves are located within the Rural Municipality of Rosser.

In summary, the Rural Municipality of Rockwood contains nearly all the available naturally occurring sand and gravel deposits and produces all the crushed dolomite within the planning district. The Rural Municipality of Rosser contains 35% of the near-surface dolomite reserves, but no quarries are presently producing crushed aggregate.

RECOMMENDED PLANNING STATUS

The following recommendations for protection of certain aggregate and near-surface bedrock deposits are designed to ensure that adequate reserves of sand, gravel and crushed dolomite are available for municipal use, the construction industry, and various government agencies. Land use planning must recognize the potential for conflict between mineral resource extraction and other land uses. In order to indicate where conflicting land uses should be prohibited, a Stop-Caution-Go development status has been assigned to each aggregate deposit and near-surface bedrock deposit. The recommended development status is presented as Maps 1 and 2.

TABLE 5

Estimated Demand for Aggregate in the South Interlake Planning District
(tonnes)

User	Material	1 Year	25 Years
Department of Highways	sand and gravel	33 900	847 500
	crushed dolomite	22 600	565 000
Rural Municipality of Rockwood	sand and gravel	34 000	850 000
	crushed dolomite	-	-
Rural Municipality of Rosser	sand and gravel	27 300	682 900
	crushed dolomite	-	-
Private Construction	sand and gravel	9 000	225 000
	crushed dolomite	13 600	340 000
City of Winnipeg	sand and gravel	-	-
	crushed dolomite	960 300	24 000 200
Total	sand and gravel	104 300	2 605 400
	crushed dolomite	996 600	24 905 000

TABLE 6

Aggregate Supply and Demand Within the South Interlake Planning District
(tonnes)

	Supply	Demand	
		1 Year	25 Years
Sand and Gravel	33 071 200	104 300	2 605 400
Crushed Dolomite	171 269 300	996 600	24 905 000
Total	204 340 500	1 100 900	27 510 400

Aggregate Deposits

The recommended development status for each aggregate deposit is based upon:

i) size and quality of the deposits as defined by grain size analysis and potential industrial uses (Appendix I),
ii) present and past use of the resource, and
iii) the economic viability of stripping overburden to gain access to the aggregate.

In a manner consistent with Land Use Policy #13, Manitoba Regulation 217/80 (Appendix II) the Stop status indicates a valuable deposit upon which no conflicting land use should be allowed. Conflicting land uses would include housing (including the subdivision of lots for residential use), or the imposition of highways or utility corridors over the deposit. Such developments should be deferred until the mineral is extracted and the site rehabilitated. In the Rural Municipality of Rockwood,the Stop status is assigned to five deposits, numbers 4518, 4520, 4526, 2527 and 4533, due to their medium-high quality and their number of active pits. The unmined portions of deposit 337 within the Rural Municipality of Rosser has also been assigned a Stop status.

The Caution status denotes a deposit whose full potential is not proven, or whose quality is not high, but has been recognized as valuable to the region. The caution status is assigned to the low to medium quality beach ridge deposits. Those deposits designated as Caution could have a conflicting land use allocated after reviewing the local needs. Go denotes a deposit of no present recognized value as an aggregate source, and consequently conflicting land uses may be permitted. The Go status is confined to the low quality linear beach ridge deposits.

Near-Surface Bedrock

The development status assigned to the near-surface (less than 3 m) dolomite deposits are based upon the suitability of each bedrock formation for potential aggregate production. The demand for aggregate derived from crushed dolomite exceeds the demand for sand and gravel by a factor of 15 to 1.0. It is anticipated that as sand and gravel reserves in the Birds Hill area near depletion, increased importance will be placed upon the near-surface dolomite deposits to supply the Winnipeg market.

The Stop status is assigned to those geological formations with the highest potential for aggregate production. Since the production of aggregate from dolomite involves the blasting, crushing and transporting of dolomite, there is noise, dust and vibration associated with the mining process. It is recommended that no residential development be permitted in close proximity to existing quarries, and no conflicting land uses be permitted in those areas designated with a Stop status. No conflicting land uses, particularly in those areas designated as Stop in the southern portion of the municipality, should be permitted due to the close proximity of the near-surface bedrock to the City of Winnipeg market and P.T.H. 7, the major transportation corridor. Conflicting land uses may be permitted after the mineral has been

extracted and the quarry site rehabilitated (Fig. 8, 9 and 10).

The Caution and Go status are assigned to those geological formations of lesser potential aggregate quality, and are located on the periphery of the near surface dolomite deposits with the Stop status. Even though they are assigned a Caution and Go status, discretion should be used for the type of development permitted due to their close proximity to potential quarry sites.

Figure 8. Airphoto (scale 1:5068) showing rehabilitated quarry site in Stonewall. The former quarry is used as a recreation site with swimming pool (1), trailer park (2), and baseball field (3). Portion of the quarry (4) unrehabilitated.

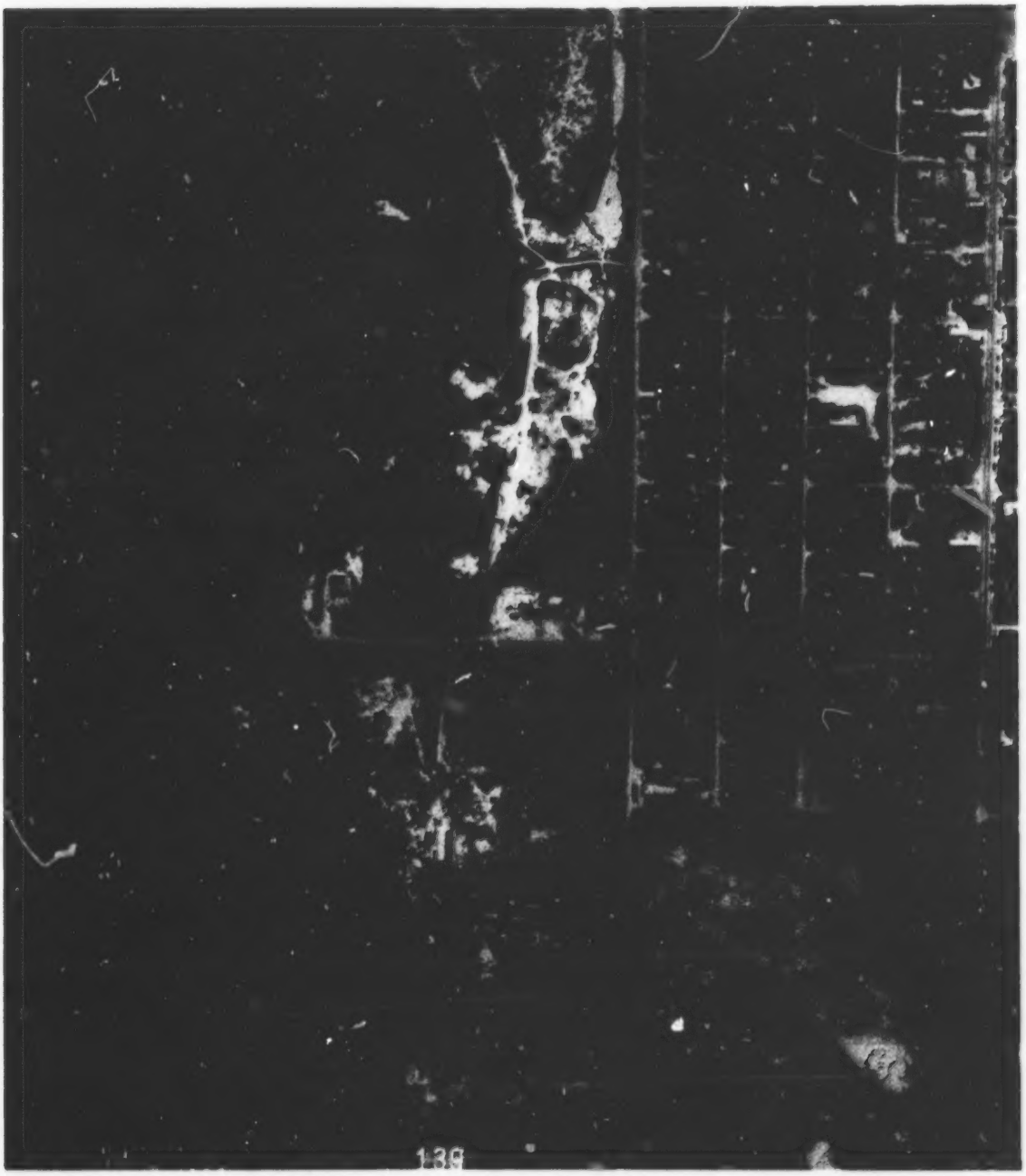

Figure 9. Airphoto (scale 1:5068) showing inactive quarries within Stonewall. Residential development (1) adjacent to quarries precludes further mining. The inactive quarries are currently being used for residential development (2) and as a lumber-yard (3).

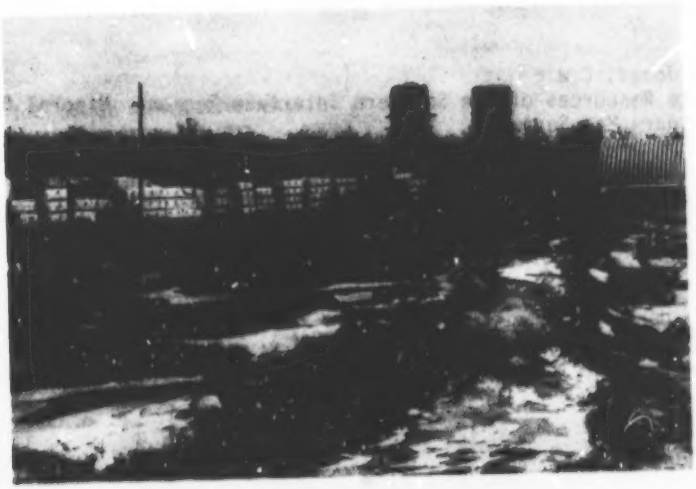

Figure 10. Secondary land use for former quarry site in Stonewall. The quarry is used as a lumberyard. Kilns in background.

CONCLUSION

A comparison of supply and demand within the South Interlake Planning District shows that there are 33.0 million tonnes of naturally occurring sand and gravel of various quality, with a projected annual demand of 104 300 tonnes. Although the supply is sufficient for the next 25 years, (specifically, the supply will equal demand in 317 years), an estimated 98% of all naturally occurring sand and gravel is located within the Rural Municipality of Rockwood.

Demand for crushed dolomite is currently 1 100 900 tonnes annually; with estimated supply of 204 340 500 tonnes, there are sufficient reserves in excess of 25 years.

At the current rate of consumption, the supply of crushed dolomite will last an estimated 185 years. The Rural Municipality of Rockwood presently supplies 100% of all the crushed dolomite, while 35% of all known reserves of dolomite are located within the Rural Municipality of Rosser.

In summary, the Rural Municipality of Rockwood contains nearly all the available naturally occurring sand and gravel deposits and produces all the crushed dolomite within the planning district. The Rural Municipality of Rosser contains 35% of the near-surface dolomite reserves, but no quarries are presently producing crushed aggregate.

Each potential aggregate source within the planning district is assigned a development status. The recommended development status should be used as an aid by land use planners to ensure that an adequate supply of aggregate is available to meet construction requirements.

REFERENCES

Bannatyne, B., and Jones, C.W.
1979: Dolomite Resources of the Southern Interlake Region. Mineral Resources Division, Preliminary Map Series.

James F. MacLaren Limited
1980: Mineral Aggregate Study of the Southern Interlake Region, v. 1 and 2. Mineral Resources Division, Open File Report 80-2, 51 p.

APPENDIX I

SAMPLE IDENTIFICATION 004518 01301E315E00045A
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 2605.36 GMS. WASHED SAMPLE - WEIGHT BEFORE 355.16 AFTER 302.03 % LOSS 14.96

STEVE SIZE	FINE FRACTION (GMS.)	STEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		197.03	7.79	92.21	7.79
1 IN		91.14	3.51	89.71	8.29
3/4 IN		59.64	1.57	87.74	10.26
5/8 IN	7.22	52.96	1.82	86.09	12.91
1/2 IN	7.55	52.96	1.82	84.27	14.73
3/8 IN	7.55	52.96	1.82	82.47	16.53
1/4 IN	23.58	172.98	5.96	78.48	21.52
# 4	23.58	172.98	5.96	74.52	25.48
# 6	19.43	215.89	7.44	69.08	30.92
# 8	19.43	151.92	5.24	63.84	36.16
# 10	20.61	215.89	7.44	58.40	41.60
# 16	29.95	216.77	7.47	52.93	47.07
# 30	29.95	151.92	5.24	47.69	52.31
# 40	8.91	65.36	2.25	45.44	54.56
# 50	8.25	60.52	2.09	43.35	56.65
# 80	29.16	213.51	7.36	35.99	64.01
# 100	20.89	153.24	5.28	30.71	69.29
# 200	81.24	445.84	15.36	15.35	84.65
<200 + W	58.85	431.71	14.87	0.0	100.00

TOTALS 355.16 2903.17
SPLITTING FACTOR 7.34
FINENESS MODULUS 3.30
% COBBLES 0.0 % PEBBLES 27.65 % GRANULES 14.87 % SAND 42.61 % SILT/CLAY 14.87

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INDUSTRIAL USAGE ASSESSMENT

004518 01301E315E00045A

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* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *
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INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4)
ASPHALT A (P. OF M.)	49.56	NOT SUIT					
ASPHALT B (P. OF M.)	40.66	NOT SUIT					
ASPHALT C (P. OF M.)	7.19	MARGINAL	YES				YES
BASE COURSE A (P. OF M.)	38.59	NOT SUIT					
BASE COURSE B (P. OF M.)	19.27	MARGINAL	YES		YES		YES
BASE COURSE C (P. OF M.)	1.0	SUITABLE					
SUB-BASE/BASE COURSE A (ASTM D1241)	83.52	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	46.65	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	53.02	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	3.05	MARGINAL	YES				YES
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	1.35	MARGINAL	YES				YES
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	1.35	MARGINAL	YES				YES
TRAFFIC GRAVEL A (P. OF M.)	44.59	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	39.59	NOT SUIT					
TRAFFIC GRAVEL C (P. OF M.)	35.02	NOT SUIT					
TRAFFIC GRAVEL D (P. OF M.)	27.44	MARGINAL	YES		YES		YES
SEAL COAT A (P. OF M.)	108.22	NOT SUIT					
SEAL COAT B (P. OF M.)	94.23	NOT SUIT					
SEAL COAT C (P. OF M.)	74.63	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33;D448)	210.83	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	209.83	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33;D448)	207.82	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	194.28	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	159.46	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	202.02	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	187.09	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	187.09	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33;D448)	251.61	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	179.58	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	206.73	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	188.48	NOT SUIT					
COARSE AGGREGATE 68 (ASTM C33;D448)	210.85	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	206.47	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	206.47	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	191.42	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	193.42	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	166.72	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33;D448)	19.66	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (P. OF M.)	24.38	NOT SUIT					
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	62.20	NOT SUIT					
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	33.20	MARGINAL	YES				YES
MORTAR (ASTM C144)	26.95	NOT SUIT					
PORTLAND CEMENT (P.C.A.)	175.93	NOT SUIT					
BUILT-UP ROOFS (ASTM D1863)	45.55	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	3.57	MARGINAL	YES		YES		YES
PIT RUN (P. OF M.)	29.56	MARGINAL	YES		YES		
SEPTIC FIELDS (U.M.A.)	2.35	MARGINAL				YES	
SHOULDERS (P. OF M.)							

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 6

SAMPLE IDENTIFICATION 004526 01402E21SW00052A
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 1107.48 GMS. WASHED SAMPLE - WEIGHT BEFORE 1101.89 AFTER 1048.12 % LOSS 4.88

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		350.58	15.09	84.91	15.09
1 1/2 IN		472.52	20.34	64.58	35.42
1 IN		132.05	5.68	58.89	41.11
3/4 IN		264.06	11.36	47.53	52.47
5/8 IN	121.75	122.37	5.27	42.26	57.74
1/2 IN	151.75	155.37	6.69	35.57	64.43
3/8 IN	151.75	122.37	5.27	30.30	69.70
1/4 IN		46.18	2.00	28.30	71.70
# 4		46.41	2.00	26.30	73.70
# 6		64.28	2.77	23.53	76.47
# 10		64.39	2.77	20.76	79.24
# 16	113.69	114.27	4.92	15.84	84.16
# 30	149.44	149.40	6.43	9.41	90.59
# 40	75.75	76.13	3.28	6.13	93.87
# 50	45.54	45.47	1.96	4.17	95.83
# 80	31.71	31.87	1.37	2.80	97.20
# 100	6.37	6.40	0.28	2.52	97.48
# 200	10.65	10.70	0.46	2.06	97.94
<200 + M	60.26	60.56	2.61	0.0	100.00
TOTALS	1098.74	2323.55			

SPLITTING FACTOR 1.01
FINENESS MODULUS 6.69
% COBBLES 0.0 % PEBBLES 72.27 % GRANULES 5.53 % SAND 19.59 % SILT/CLAY 2.61

I N D U S T R I A L U S A G E A S S E S S M E N T 004526 01402E21SW00052A

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#
ASPHALT A (P. OF M.)	12.10	MARGINAL	YES				
ASPHALT B (P. OF M.)	3.24	MARGINAL	YES				
ASPHALT C (P. OF M.)	50.74	NOT SUIT					
BASE COURSE A (P. OF M.)	5.29	MARGINAL	YES	YES			
BASE COURSE B (P. OF M.)	6.00	MARGINAL	YES				
BASE COURSE C (P. OF M.)	1.72	MARGINAL	YES	YES			
SUB-BASE/BASE COURSE A (ASTM D1241)	1.72	MARGINAL	YES				
SUB-BASE/BASE COURSE B (ASTM D1241)	10.44	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	5.71	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	35.05	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	21.93	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	63.25	NOT SUIT					
TRAFFIC GRAVEL A (P. OF M.)	4.25	MARGINAL	YES	YES			YES
TRAFFIC GRAVEL B (P. OF M.)	2.55	MARGINAL	YES	YES			
TRAFFIC GRAVEL C (P. OF M.)	2.61	MARGINAL	YES				
TRAFFIC GRAVEL D (P. OF M.)	0.0	SUITABLE	YES				
SEAL COAT A (P. OF M.)	102.59	NOT SUIT					
SEAL COAT B (P. OF M.)	6.72	MARGINAL	YES		YES		YES
SEAL COAT C (P. OF M.)	3.05	MARGINAL	YES				YES
COARSE AGGREGATE 1 (ASTM C33,D448)	133.73	NOT SUIT					
COARSE AGGREGATE 1 (ASTM C33,D448)	102.73	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33,D448)	75.90	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33,D448)	82.50	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33,D448)	41.42	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33,D448)	103.71	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33,D448)	74.04	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33,D448)	111.48	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33,D448)	87.40	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33,D448)	73.45	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33,D448)	101.51	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33,D448)	87.21	NOT SUIT					
COARSE AGGREGATE 68 (ASTM C33,D448)	91.55	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33,D448)	107.53	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33,D448)	153.07	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33,D448)	117.10	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33,D448)	152.67	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33,D448)	100.21	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33,D448)	7.55	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (P. OF M.)	2.13	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	12.13	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	11.63	MARGINAL	YES				YES
MORTAR (ASTM C144)	4.93	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	4.47	MARGINAL	YES				YES
BUILT-UP ROOFS (ASTM D1863)	106.03	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	0.0	SUITABLE	YES				
FILL (P. OF M.)	0.0	SUITABLE	YES				
SEPTIC FIELDS (U.M.A.)	3.60	MARGINAL	YES		YES		
SHOULDERS (P. OF M.)	0.0	SUITABLE	YES				

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 4

SAMPLE IDENTIFICATION 004520 01301E12NW00513
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 98.30 GMS. WASHED SAMPLE - WEIGHT BEFORE 98.30 AFTER 98.30 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		0.50	0.50	99.50	0.50
3/4 IN		1.20	1.20	98.30	1.70
5/8 IN	0.60	1.80	1.80	97.70	2.30
1/2 IN	1.00	3.00	3.00	96.70	3.30
3/8 IN	0.90	3.90	3.90	95.80	4.20
1/4 IN	2.40	6.30	6.30	93.40	6.60
#4	3.70	10.00	10.00	90.00	9.50
#6	11.50	11.50	11.50	78.50	21.50
#10	28.30	28.30	28.30	50.20	49.80
#16	22.10	17.10	17.10	33.10	66.90
#30	11.70	11.70	11.70	21.40	78.60
#40	10.60	10.60	10.60	10.80	89.20
#50	4.60	4.60	4.60	6.20	93.80
#80	0.40	0.40	0.50	5.70	94.30
#100	0.50	0.50	0.50	5.20	94.80
#200	1.70	1.70	1.70	3.50	96.50
<200 + W				0.0	100.00
TOTALS	98.30	100.00			

SPLITTING FACTOR 1.00
FINENESS MODULUS 3.51
% COBBLES 0.0 % PEBBLES 9.30 % GRANULES 14.40 % SAND 74.60 % SILT/CLAY 1.70

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INDUSTRIAL USAGE ASSESSMENT

004520 01301E12NW00513

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	CRUSHING REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4)
ASPHALT A (P. OF M.)	22.62	NOT SUIT					
ASPHALT B (P. OF M.)	23.22	NOT SUIT					
ASPHALT C (P. OF M.)	21.10	NOT SUIT					
BASE COURSE A (P. OF M.)	2.30	MARGINAL		YES		YES	YES
BASE COURSE B (P. OF M.)	1.00	MARGINAL		YES		YES	
BASE COURSE C (P. OF M.)	13.00	MARGINAL					
SUB-BASE/BASE COURSE A (ASTM D1241)	103.18	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	40.60	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	22.26	MARGINAL	YES	YES	YES		YES
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	26.24	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	6.20	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	13.40	MARGINAL					
TRAFFIC GRAVEL A (P. OF M.)	79.53	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	69.53	NOT SUIT					
TRAFFIC GRAVEL C (P. OF M.)	50.62	NOT SUIT					
TRAFFIC GRAVEL D (P. OF M.)	34.62	MARGINAL	YES		YES		
SEAL COAT A (P. OF M.)	114.42	NOT SUIT					
SEAL COAT B (P. OF M.)	27.08	MARGINAL	YES		YES		YES
SEAL COAT C (P. OF M.)	2.00	SUITABLE	YES				
COARSE AGGREGATE 1 (ASTM C33;D448)	219.00	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33;D448)	209.00	NOT SUIT					
COARSE AGGREGATE 3/4 (ASTM C33;D448)	220.20	NOT SUIT					
COARSE AGGREGATE 1/2 (ASTM C33;D448)	202.20	NOT SUIT					
COARSE AGGREGATE 3/8 #57 (ASTM C33;D448)	195.68	NOT SUIT					
COARSE AGGREGATE #4 (ASTM C33;D448)	180.80	NOT SUIT					
COARSE AGGREGATE #8 #67 (ASTM C33;D448)	181.80	NOT SUIT					
COARSE AGGREGATE #10 (ASTM C33;D448)	182.80	NOT SUIT					
COARSE AGGREGATE #16 #7 (ASTM C33;D448)	191.80	NOT SUIT					
COARSE AGGREGATE #30 (ASTM C33;D448)	210.97	NOT SUIT					
COARSE AGGREGATE #40 #7 (ASTM C33;D448)	208.97	NOT SUIT					
COARSE AGGREGATE #50 #6 (ASTM C33;D448)	208.97	NOT SUIT					
COARSE AGGREGATE #80 (ASTM C33;D448)	202.41	NOT SUIT					
COARSE AGGREGATE #100 #8 (ASTM C33;D448)	175.61	NOT SUIT					
COARSE AGGREGATE #200 #9 (ASTM C33;D448)	131.86	NOT SUIT					YES
COARSE AGGREGATE #10 (ASTM C33;D448)	83.58	NOT SUIT					
FINE CONCRETE AGGREGATE (P. OF M.)	8.54	MARGINAL	YES				
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	2.67	MARGINAL	YES				
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	21.44	MARGINAL	YES				
MORTAR (ASTM C144)	5.78	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	2.40	MARGINAL	YES				
BUILT-UP ROOFS (ASTM D1863)	180.51	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	15.70	MARGINAL				YES	
BITUMEN (P. OF M.)	13.30	MARGINAL				YES	
SEPTIC FIELDS (U.M.A.)	28.70	MARGINAL					
SHOULDERS (P. OF M.)							

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 5

SAMPLE IDENTIFICATION 004520 01302E06N400514
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 91.90 GMS. WASHED SAMPLE - WEIGHT BEFORE 91.90 AFTER 91.90 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		1.90	1.90	98.10	1.90
1 1/2 IN		2.40	2.40	95.70	4.30
1 IN		1.60	1.60	94.10	5.90
3/4 IN		1.20	1.20	92.90	7.10
1/2 IN	1.00	0.00	1.00	91.90	8.10
3/8 IN	0.40	0.00	0.40	91.50	8.50
1/4 IN	1.80	0.00	1.80	89.70	10.30
#4	3.30	1.80	3.30	86.40	13.60
#6	3.70	3.70	3.70	82.70	17.30
#10	4.50	4.50	4.50	78.20	21.80
#16	21.50	20.50	21.50	56.70	43.30
#30	33.40	33.20	33.40	23.30	76.70
#40	15.40	15.20	15.40	7.90	92.10
#50	5.50	5.50	5.50	2.40	97.60
#80	3.30	3.30	3.30	-.90	100.90
#100	0.80	0.80	0.80	-1.70	101.70
#200	0.00	0.00	0.00	-1.70	101.70
<200 + M	1.50	1.50	1.50	0.0	100.00
TOTALS	91.90	100.00			

SPLITTING FACTOR 1.00
FINENESS MODULUS 3.81
% COBBLES 0.0 % PEBBLES 14.50 % GRANULES 11.20 % SAND 72.80 % SILT/CLAY 1.50

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INDUSTRIAL USAGE ASSESSMENT

004520 01302E06N400514

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* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *
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INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	ADDITION OF FINES (MATERIAL NOT ON SITE	(MATERIAL <#4
ASPHALT A (P. OF M.)	60.76	NOT SUIT					
ASPHALT B (P. OF M.)	46.75	NOT SUIT					
ASPHALT C (P. OF M.)	59.87	NOT SUIT					
BASE COURSE A (P. OF M.)	50.26	NOT SUIT					
BASE COURSE B (P. OF M.)	33.84	NOT SUIT					
BASE COURSE C (P. OF M.)	7.63	MARGINAL	YES	YES	YES		
SUB-BASE/BASE COURSE A (ASTM D1241)	94.70	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	85.44	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	73.44	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	37.16	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	13.84	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	22.54	MARGINAL	YES	YES			
TRAFFIC GRAVEL A (P. OF M.)	83.40	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	69.40	NOT SUIT					
TRAFFIC GRAVEL C (P. OF M.)	53.51	NOT SUIT					
SEAL COAT A (P. OF M.)	23.42	MARGINAL	YES		YES		
SEAL COAT B (P. OF M.)	116.38	NOT SUIT					
SEAL COAT C (P. OF M.)	24.76	MARGINAL	YES		YES		
COARSE AGGREGATE 1 (ASTM C33;D448)	0.0	SUITABLE	YES				
COARSE AGGREGATE 2 (ASTM C33;D448)	206.10	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33;D448)	178.50	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	170.41	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	169.80	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	204.50	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	205.45	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	167.70	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	214.40	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33;D448)	214.85	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	180.27	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	190.57	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	200.71	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	197.91	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	183.78	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	183.93	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	214.53	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	180.27	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	80.65	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33;D448)	7.00	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (P. OF M.)	4.67	MARGINAL	YES				
FINE CONCRETE AGGREGATE I (ASTM C33; C402)	8.19	MARGINAL	YES				
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	24.31	MARGINAL	YES				
MORTAR (ASTM C144)	8.19	MARGINAL	YES				
PORTLAND CEMENT (P. C.A.)	8.19	MARGINAL	YES				
RIP-RAP CLUB ROCKS (ASTM D1863)	102.16	NOT SUIT					
STAGEFIELD RUNWAYS (P. OF M.)	82.14	NOT SUIT					
SUB-BASE (P. OF M.)	14.45	MARGINAL	YES		YES		
SEPTIC FIELDS (U.H.A.)	24.03	MARGINAL	YES		YES		
SHOULDERS (P. OF M.)	17.16	MARGINAL	YES		YES		

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 5

SAMPLE IDENTIFICATION 004535 01601E25SE00089A

AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE

WEIGHT OF SAND 449.16 GMS. WASHED SAMPLE - WEIGHT BEFORE 447.56 AFTER 447.56 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		0.0	0.0	100.00	0.0
3/4 IN		0.0	0.0	100.00	0.0
1/2 IN		1.54	0.34	99.66	0.34
3/8 IN	1.53	1.54	0.34	99.32	0.68
1/2 IN	1.53	1.54	0.34	98.97	1.03
3/8 IN	1.53	1.54	0.34	98.63	1.37
1/4 IN	20.39	20.46	4.49	94.14	5.86
#4	20.39	20.46	4.49	89.66	10.34
#6	20.39	20.46	4.49	85.16	14.84
#8	43.25	43.67	9.59	80.64	19.36
#10	43.25	43.67	9.59	70.42	29.58
#16	74.55	74.55	16.36	54.05	45.95
#30	122.70	123.40	27.07	26.98	73.02
#40	49.71	49.89	11.11	15.87	84.13
#50	19.48	19.54	4.05	11.83	88.17
#80	21.72	21.82	4.86	6.97	93.03
#100	7.55	7.58	1.66	5.32	94.68
#200	14.33	14.39	3.16	2.42	97.58
<200 + W	10.82	10.86	2.42	0.0	100.00
TOTALS	447.56	449.16			

SPLITTING FACTOR 1.00

FINENESS MODULUS 3.33

% COBBLES 0.0 % PEBBLES 10.14 % GRANULES 19.45 % SAND 68.00 % SILT/CLAY 2.42

INDUSTRIAL USAGE ASSESSMENT

004535 01601E25SE00089A

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	CRUSHING REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4)
ASPHALT A (P. OF M.)	44.25	NOT SUIT					
ASPHALT B (P. OF M.)	14.25	NOT SUIT					
ASPHALT C (P. OF M.)	50.16	NOT SUIT					
BASE COURSE A (P. OF M.)	40.00	NOT SUIT					
BASE COURSE B (P. OF M.)	21.84	MARGINAL		YES		YES	YES
BASE COURSE C (P. OF M.)	21.84	MARGINAL		YES		YES	
BASE COURSE D (P. OF M.)	21.84	MARGINAL					
SUB-BASE/BASE COURSE A (ASTM D1241)	44.25	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	44.25	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	41.64	NOT SUIT				YES	YES
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	20.39	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	20.11	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	20.11	MARGINAL	YES	YES			
TRAFFIC GRAVEL A (P. OF M.)	20.68	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	24.68	NOT SUIT				YES	
TRAFFIC GRAVEL C (P. OF M.)	24.68	MARGINAL					
SEAL COAT A (P. OF M.)	101.64	NOT SUIT			YES		YES
SEAL COAT B (P. OF M.)	21.64	MARGINAL	YES				
SEAL COAT C (P. OF M.)	0.0	SUITABLE	YES				
COARSE AGGREGATE 1 (ASTM C33;D448)	221.42	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33;D448)	196.74	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33;D448)	210.74	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33;D448)	210.74	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	225.40	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	225.40	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	225.40	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	239.74	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33;D448)	239.74	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	254.74	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	254.74	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	270.40	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	270.40	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	180.68	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	209.08	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	195.08	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	195.08	NOT SUIT					YES
COARSE AGGREGATE 9 (ASTM C33;D448)	81.43	MARGINAL	YES				
COARSE AGGREGATE 10 (ASTM C33;D448)	0.0	SUITABLE	YES				
FINE CONCRETE AGGREGATE (P. OF M.)	0.0	SUITABLE	YES				
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	11.71	MARGINAL	YES				
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	11.71	MARGINAL	YES				
MORTAR (ASTM C144)	11.71	MARGINAL	YES				
PORTLAND CEMENT (P. OF M.)	0.0	SUITABLE	YES				
BUILT-UP ROOFS (ASTM D1863)	100.28	NOT SUIT					
AGGFIELD RUNWAYS (P. OF M.)	14.84	MARGINAL				YES	
BITUMEN (P. OF M.)	12.84	MARGINAL				YES	
SEPTIC FIELDS (U.M.A.)	10.00	MARGINAL				YES	
SHOULDERS (P. OF M.)	10.84	MARGINAL					

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 5

SAMPLE IDENTIFICATION 004527 01401E215W00515
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 88.00 GMS. WASHED SAMPLE - WEIGHT BEFORE 88.00 AFTER 88.00 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		3.00	3.00	97.00	3.00
1 1/2 IN		4.00	4.00	93.00	4.00
1 IN		4.00	4.00	89.00	4.00
3/4 IN		3.00	3.00	86.00	3.00
5/8 IN	2.00	12.00	12.00	74.00	12.00
1/2 IN	5.00	7.00	7.00	67.00	7.00
3/8 IN	4.00	6.00	6.00	61.00	6.00
1/4 IN	7.00	7.00	7.00	54.00	7.00
#4	7.00	7.00	7.00	47.00	7.00
#8	11.00	12.00	12.00	35.00	12.00
#10	20.00	20.00	20.00	15.00	20.00
#16	5.00	5.00	5.00	10.00	5.00
#30	4.00	4.00	4.00	6.00	4.00
#40	2.00	2.00	2.00	4.00	2.00
#50	1.00	1.00	1.00	3.00	1.00
#80	1.00	1.00	1.00	2.00	1.00
#100	0.00	0.00	0.00	2.00	0.00
#200	0.00	0.00	0.00	2.00	0.00
<200 + W	1.30	1.30	1.30	0.0	100.00
TOTALS	88.00	100.00			

SPLITTING FACTOR 1.00
FINENESS MODULUS 4.61
% COBBLES 0.0 % PEBBLES 37.20 % GRANULES 13.80 % SAND 45.70 % SILT/CLAY 3.30

I N D U S T R I A L U S A G E A S S E S S M E N T 004527 01401E215W00515

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	CRUSHING REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4
ASPHALT A (P. OF M.)	3.05	MARGINAL	YES		YES		YES
ASPHALT B (P. OF M.)	3.65	MARGINAL	YES				YES
ASPHALT C (P. OF M.)	42.65	NOT SUIT					
BASE COURSE A (P. OF M.)	0.30	MARGINAL	YES	YES	YES		YES
BASE COURSE B (P. OF M.)	0.40	MARGINAL	YES	YES			
BASE COURSE C (P. OF M.)	0.60	MARGINAL	YES	YES			
SUB-BASE/BASE COURSE A (ASTM D1241)	35.40	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	17.05	MARGINAL	YES	YES	YES		YES
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	3.75	MARGINAL	YES	YES	YES		YES
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	12.15	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	3.35	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	1.45	MARGINAL	YES	YES			
TRAFFIC GRAVEL A (P. OF M.)	2.40	MARGINAL	YES	YES	YES		YES
TRAFFIC GRAVEL B (P. OF M.)	2.40	MARGINAL	YES	YES	YES		YES
TRAFFIC GRAVEL C (P. OF M.)	0.11	MARGINAL	YES		YES		
TRAFFIC GRAVEL D (P. OF M.)	0.0	SUITABLE	YES				
SEAL COAT A (P. OF M.)	84.54	NOT SUIT					
SEAL COAT B (P. OF M.)	10.75	MARGINAL	YES		YES		YES
SEAL COAT C (P. OF M.)	2.05	MARGINAL	YES				YES
COARSE AGGREGATE 1 (ASTM C33;D448)	28.05	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33;D448)	19.30	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33;D448)	19.30	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33;D448)	19.30	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	13.10	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	19.30	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	12.07	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	8.82	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33;D448)	13.60	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	12.04	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	13.60	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	13.60	NOT SUIT					
COARSE AGGREGATE 68 (ASTM C33;D448)	13.60	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	13.60	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	13.60	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	13.60	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	13.60	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	9.70	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33;D448)	3.45	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (P. OF M.)	22.75	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	44.75	NOT SUIT					
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	24.75	MARGINAL	YES				YES
MORTAR (ASTM C144)	24.75	MARGINAL	YES				YES
PORTLAND CEMENT (P. C. A.)	22.88	MARGINAL	YES				YES
BUILT-UP ROOFS (ASTM D1863)	134.75	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	0.0	SUITABLE	YES				
PAVEMENT (P. OF M.)	0.0	SUITABLE	YES				
SEPTIC FIELDS (U.S.A.)	23.62	MARGINAL	YES		YES		
SHOULDERS (P. OF M.)	0.0	SUITABLE	YES				

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 4

SAMPLE IDENTIFICATION 004530 01501E05NE00059A
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 1613.54 GMS. WASHED SAMPLE - WEIGHT BEFORE 375.32 AFTER 371.34 % LOSS 1.06

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		535.61	17.14	82.86	17.14
3 IN		538.01	17.16	65.69	34.31
2 1/2 IN		139.16	4.43	61.25	38.75
2 IN		139.16	4.43	56.83	43.17
1 1/2 IN		0.0	0.0	56.83	43.17
1 IN		117.42	3.74	53.08	46.92
3/4 IN		62.85	1.80	51.40	48.60
5/8 IN	16.84	72.40	3.31	48.09	51.91
1/2 IN	16.84	72.40	3.31	44.79	55.21
3/8 IN	16.84	72.40	3.31	41.48	58.52
1/4 IN	33.97	68.72	4.13	37.36	62.64
#4	33.97	98.28	4.13	33.24	66.76
#8	40.91	175.92	5.60	27.64	72.36
#10	40.91	175.96	5.61	22.03	77.97
#16	44.28	169.32	5.06	16.97	83.03
#30	72.69	132.50	3.93	13.04	86.96
#40	28.59	122.05	3.87	9.17	90.83
#50	20.14	87.44	2.79	6.38	93.62
#80	22.15	95.13	3.03	3.35	96.65
#100	1.89	8.43	0.27	3.08	96.92
#200	1.89	8.43	0.27	2.81	97.19
<200 + M	5.47	23.52	0.75	0.0	100.00
TOTALS	375.32	3139.35			

SPLITTING FACTOR 4.30
FINENESS MODULUS 6.74
% COBBLES 38.75 % PEBBLES 23.07 % GRANULES 11.21 % SAND 26.23 % SILT/CLAY 0.75

I I

I N D U S T R I A L U S A G E A S S E S S M E N T

004530 01501E05NE00059A

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4)
ASPHALT A (P. OF M.)	6.08	MARGINAL	YES	YES	YES		
ASPHALT B (P. OF M.)	0.94	MARGINAL	YES	YES			
ASPHALT C (P. OF M.)	57.42	NOT SUIT					
BASE COURSE A (P. OF M.)	12.08	MARGINAL	YES	YES	YES		
BASE COURSE B (P. OF M.)	5.23	MARGINAL	YES	YES			
BASE COURSE C (P. OF M.)	3.68	MARGINAL	YES	YES			
SUB-BASE/BASE COURSE A (ASTM D1241)	33.95	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	16.08	MARGINAL	YES	YES	YES		YES
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	13.03	MARGINAL	YES	YES	YES		YES
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	18.26	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	11.26	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	37.44	MARGINAL	YES	YES			
TRAFFIC GRAVEL A (P. OF M.)	59.36	MARGINAL	YES	YES	YES		YES
TRAFFIC GRAVEL B (P. OF M.)	11.87	MARGINAL	YES	YES	YES		
TRAFFIC GRAVEL C (P. OF M.)	1.44	MARGINAL	YES		YES		
TRAFFIC GRAVEL D (P. OF M.)	1.44	MARGINAL	YES		YES		
SEAL COAT A (P. OF M.)	86.51	NOT SUIT					
SEAL COAT B (P. OF M.)	11.74	MARGINAL	YES		YES		YES
SEAL COAT C (P. OF M.)	0.0	SUITABLE	YES				
COARSE AGGREGATE 1 (ASTM C33;D448)	99.93	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33;D448)	161.99	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33;D448)	141.68	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33;D448)	153.84	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	153.84	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	157.47	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	157.46	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	161.83	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33;D448)	160.60	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	129.79	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	157.83	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	157.83	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	161.99	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	159.69	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	159.69	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	161.86	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	162.74	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33;D448)	75.68	NOT SUIT					YES
COARSE CONCRETE AGGREGATE (P. OF M.)	0.44	MARGINAL	YES				
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	12.53	MARGINAL	YES				
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	24.97	MARGINAL	YES				
MORTAR (ASTM C144)	9.67	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	3.66	MARGINAL	YES				
BUILT-UP ROOFS (ASTM D1863)	135.68	NOT SUIT					
ASPHALT FELT ROOFING (P. OF M.)	0.87	MARGINAL	YES		YES		
SPRAY GUN (P. OF M.)	0.0	SUITABLE	YES		YES		
SEPTIC FIELDS (U.M.A.)	24.45	MARGINAL	YES				
SHOULDERS (P. OF M.)	0.0	SUITABLE	YES				

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 4

SAMPLE IDENTIFICATION 004530 01601E01SW00062A

AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE

WEIGHT OF SAND 663.71 GMS. WASHED SAMPLE - WEIGHT BEFORE 76.65 AFTER 73.06 % LOSS 4.68

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		0.0	0.0	100.00	0.0
3/4 IN		36.36	5.49	94.51	5.49
5/8 IN	0.70	9.09	0.86	93.65	6.35
1/2 IN	0.70	9.09	0.86	92.78	7.22
3/8 IN	0.70	9.09	0.86	91.92	8.08
1/4 IN	0.45	5.00	0.53	91.37	8.63
#4	0.44	5.01	0.52	90.82	9.18
#8	1.09	9.44	1.34	89.48	10.52
#10	1.06	9.35	1.33	88.15	11.85
#16	1.51	13.05	1.76	86.39	13.61
#30	2.28	19.44	2.69	83.69	16.31
#40	1.40	11.94	1.66	82.04	17.96
#50	2.18	18.54	2.58	79.46	20.54
#80	3.40	28.94	4.09	75.37	24.63
#100	18.03	156.12	25.23	51.11	48.89
#140	12.64	111.18	15.83	35.28	64.72
#200	22.90	198.26	28.24	7.04	92.96
<200 + W	5.71	49.44	7.04	0.0	100.00
TOTALS	76.65	702.27			

SPLITTING FACTOR 8.66

FINENESS MODULUS 1.56

% COBBLES 0.0 % PEBBLES 9.18 % GRANULES 2.68 % SAND 81.11 % SILT/CLAY 7.04

I N D U S T R I A L U S A G E A S S E S S M E N T

004530 01601E01SW00062A

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING MATERIAL ON SITE	REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4
ASPHALT A (P. OF M.)	126.00	NOT SUIT					
ASPHALT B (P. OF M.)	114.00	NOT SUIT					
ASPHALT C (P. OF M.)	0.0	SUITABLE	YES				
BASE COURSE A (P. OF M.)	119.59	NOT SUIT					
BASE COURSE B (P. OF M.)	83.71	NOT SUIT					
BASE COURSE C (P. OF M.)	10.84	MARGINAL				YES	
SUB-BASE/BASE COURSE A (ASTM D1241)	170.84	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	148.84	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	120.84	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	69.67	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	39.74	MARGINAL					YES
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	20.70	MARGINAL		YES			YES
TRAFFIC GRAVEL A (P. OF M.)	147.44	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	131.44	NOT SUIT					
TRAFFIC GRAVEL C (P. OF M.)	70.84	NOT SUIT					
SEAL COAT A (P. OF M.)	139.34	NOT SUIT					
SEAL COAT B (P. OF M.)	102.44	NOT SUIT					
SEAL COAT C (P. OF M.)	44.84	NOT SUIT					
COARSE AGGREGATE 1 (ASTM C33; D448)	210.84	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33; D448)	210.84	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33; D448)	208.84	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33; D448)	200.84	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33; D448)	217.84	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33; D448)	178.84	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33; D448)	202.84	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33; D448)	202.84	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33; D448)	202.84	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33; D448)	206.84	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33; D448)	208.84	NOT SUIT					
COARSE AGGREGATE 68 (ASTM C33; D448)	206.84	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33; D448)	204.84	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33; D448)	210.84	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33; D448)	210.84	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33; D448)	212.84	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33; D448)	212.84	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33; D448)	18.84	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (P. OF M.)	67.84	NOT SUIT					
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	112.84	NOT SUIT					
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	92.84	NOT SUIT					
CONTAM (ASTM C40)	20.84	MARGINAL	YES				YES
PORTLAND CEMENT (P.C.A.)	145.84	NOT SUIT					
BUILT-UP ROOFS (ASTM D1863)	164.84	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	111.84	NOT SUIT					
FILL DIRT (P. OF M.)	18.84	MARGINAL				YES	
SEPTIC FIELDS (U.S.A.)	24.84	MARGINAL				YES	
SHOULDERS (P. OF M.)	20.84	MARGINAL				YES	

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 7

SAMPLE IDENTIFICATION 004530 01601E25SE00066A
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 505.90 GMS. WASHED SAMPLE - WEIGHT BEFORE 504.40 AFTER 504.40 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		0.0	0.0	100.00	0.0
3/4 IN		0.0	0.0	100.00	0.0
1/2 IN		0.0	0.77	99.23	0.77
3/8 IN	3.88	4.89	0.77	98.46	1.54
#4	3.88	4.89	0.77	97.69	2.31
#6	21.00	21.06	4.16	93.53	6.47
#8	21.00	21.06	4.16	89.37	10.63
#10	34.02	34.13	6.74	82.63	17.37
#16	34.03	34.13	6.74	75.89	24.11
#20	40.69	40.81	8.07	67.82	32.18
#30	87.16	87.40	17.28	50.54	49.47
#40	46.42	46.59	9.21	41.32	58.68
#50	61.92	62.18	12.28	29.04	70.96
#70	95.13	95.61	18.90	10.14	89.86
#100	13.30	13.43	2.65	7.49	92.51
#200	6.11	6.13	1.21	6.27	93.73
<200 + W	11.66	11.69	2.31	0.0	100.00
TOTALS	504.40	505.90			

SPLITTING FACTOR 1.00
FINENESS MODULUS 2.83
% COBBLES 0.0 % PEBBLES 10.63 % GRANULES 13.49 % SAND 73.56 % SILT/CLAY 2.31

INDUSTRIAL USAGE ASSESSMENT

004530 01601E25SE00066A

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* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *
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INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	CRUSHING REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4)
ASPHALT A (P. OF M.)	59.25	NOT SUIT					
ASPHALT B (P. OF M.)	44.25	NOT SUIT					
ASPHALT C (P. OF M.)	25.19	MARGINAL	YES	YES			
BASE COURSE A (P. OF M.)	57.25	NOT SUIT					
BASE COURSE B (P. OF M.)	33.68	MARGINAL		YES		YES	
BASE COURSE C (P. OF M.)	124.25	NOT SUIT					
SUB-BASE/BASE COURSE A (ASTM D1241)	124.25	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	101.94	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	19.94	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	15.93	MARGINAL		YES		YES	YES
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	3.69	MARGINAL		YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	3.69	MARGINAL		YES			
TRAFFIC GRAVEL A (P. OF M.)	85.71	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	60.75	NOT SUIT					
TRAFFIC GRAVEL C (P. OF M.)	52.75	NOT SUIT					
SEAL COAT A (P. OF M.)	109.44	NOT SUIT					
SEAL COAT B (P. OF M.)	47.44	NOT SUIT					YES
SEAL COAT C (P. OF M.)	19.97	MARGINAL	YES				
COARSE AGGREGATE 1 (ASTM C33;D448)	511.31	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33;D448)	536.79	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33;D448)	559.77	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33;D448)	584.14	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	534.00	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	183.37	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	253.93	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	467.63	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33;D448)	159.93	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	217.63	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	260.99	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	233.60	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	180.99	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	253.60	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	155.94	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	179.94	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	126.93	NOT SUIT					YES
COARSE AGGREGATE 10 (ASTM C33;D448)	9.76	MARGINAL	YES				
FINE CONCRETE AGGREGATE (P. OF M.)	0.0	SUITABLE	YES				
FINE CONCRETE AGGREGATE 1 (ASTM C33; C404)	3.25	MARGINAL	YES				
FINE CONCRETE AGGREGATE 12 (ASTM C33; C404)	3.25	MARGINAL	YES				YES
MORTAR (ASTM C144)	15.35	MARGINAL	YES				
PORTLAND CEMENT (P. OF M.)	101.49	NOT SUIT					
BUILT-UP ROOFS (ASTM D1863)	63.75	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	14.37	MARGINAL				YES	
ASPHALT (P. OF M.)	14.37	MARGINAL				YES	
SEPTIC FIELDS (U.S.D.A.)	30.00	MARGINAL				YES	
SHOULDERS (P. OF M.)	19.37	MARGINAL					

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 5

SAMPLE IDENTIFICATION 004531 01501E27SW00069A
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 2167.71 GMS. WASHED SAMPLE - WEIGHT BEFORE 526.04 AFTER 526.04 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		180.53	7.43	92.57	7.43
3/4 IN		180.10	7.41	85.17	14.83
5/8 IN	26.31	108.42	4.19	80.98	19.02
1/2 IN	30.31	108.45	4.47	76.52	23.48
3/8 IN	36.31	108.42	4.47	72.04	27.96
1/4 IN	40.53	167.02	6.58	66.03	33.97
# 4	40.53	167.02	6.58	59.47	40.53
# 8	49.54	205.79	8.11	51.36	48.64
# 10	49.54	205.79	8.11	43.26	56.74
# 16	47.50	197.50	7.78	35.48	64.52
# 30	79.98	324.35	12.94	22.54	77.46
# 40	32.48	131.80	5.23	17.32	82.68
# 50	30.32	125.07	4.93	12.42	87.58
# 60	48.11	198.25	7.85	4.61	95.39
# 100	17.18	73.49	2.89	1.73	98.28
# 200	6.15	22.34	1.00	0.72	99.00
<200 + W	4.44	18.30	0.72	0.0	100.00
TOTALS	526.04	2536.34			

SPLITTING FACTOR 4.12
FINENESS MODULUS 4.59
% COBBLES 0.0 % PEBBLES 40.53 % GRANULES 16.23 % SAND 42.52 % SILT/CLAY 0.72

I N D U S T R I A L U S A G E A S S E S S M E N T 004531 01501E27SW00069A

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	CRUSHING REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#
ASPHALT A (P. OF M.)	1.16	MARGINAL	YES	YES			
ASPHALT B (P. OF M.)	1.16	MARGINAL	YES	YES			
ASPHALT C (P. OF M.)	48.46	NOT SUIT					
BASE COURSE A (P. OF M.)	2.16	MARGINAL	YES	YES			
BASE COURSE B (P. OF M.)	3.28	MARGINAL		YES			
BASE COURSE C (P. OF M.)	3.20	MARGINAL		YES			
SUB-BASE/GRADE COURSE A (ASTM D1241)	16.94	MARGINAL		YES		YES	YES
SUB-BASE/GRADE COURSE B (ASTM D1241)	4.94	MARGINAL		YES			
SUB-BASE/GRADE/SURFACE COURSE C (ASTM D1241)	4.33	MARGINAL	YES	YES			
SUB-BASE/GRADE/SURFACE COURSE D (ASTM D1241)	13.42	MARGINAL	YES	YES			
SUB-BASE/GRADE/SURFACE COURSE E (ASTM D1241)	5.47	MARGINAL	YES	YES			
SUB-BASE/GRADE/SURFACE COURSE F (ASTM D1241)	32.51	NOT SUIT					
TRAFFIC GRAVEL A (P. OF M.)	24.34	MARGINAL	YES	YES	YES		YES
TRAFFIC GRAVEL B (P. OF M.)	2.49	MARGINAL	YES	YES			
TRAFFIC GRAVEL C (P. OF M.)	0.0	SUITABLE	YES				
SEAL COAT A (P. OF M.)	81.48	NOT SUIT					
SEAL COAT B (P. OF M.)	14.88	MARGINAL	YES		YES		YES
SEAL COAT C (P. OF M.)	0.0	SUITABLE	YES				
COARSE AGGREGATE 1 (ASTM C33-D448)	202.47	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33-D448)	152.36	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33-D448)	126.48	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33-D448)	143.96	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33-D448)	113.88	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33-D448)	113.88	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33-D448)	113.88	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33-D448)	69.03	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33-D448)	69.03	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33-D448)	113.88	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33-D448)	120.82	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33-D448)	113.88	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33-D448)	113.88	NOT SUIT					
COARSE AGGREGATE 68 (ASTM C33-D448)	131.64	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33-D448)	134.48	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33-D448)	141.38	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33-D448)	104.68	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33-D448)	104.68	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33-D448)	104.37	NOT SUIT					
FINE CONCRETE AGGREGATE (P. OF M.)	13.76	MARGINAL	YES				
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	23.46	MARGINAL	YES				
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	6.92	MARGINAL	YES				
MORTAR (ASTM C144)	8.01	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	8.01	MARGINAL	YES				
BUILT-UP ROOFS (ASTM D1863)	12.02	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	0.16	MARGINAL	YES				
BIT MIX (P. OF M.)	0.0	SUITABLE					
SEPTIC FIELDS (U.M.A.)	15.47	MARGINAL					YES
SHOULDERS (P. OF M.)	0.0	SUITABLE					

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 4

SAMPLE IDENTIFICATION 004532 01601E15SE00071A
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 583.21 GMS. WASHED SAMPLE - WEIGHT BEFORE 566.98 AFTER 566.98 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		114.91	16.46	83.54	16.46
3/4 IN		0.0	0.0	83.54	16.46
5/8 IN	15.54	15.98	2.29	81.25	18.75
1/2 IN	15.54	15.98	2.29	78.96	21.04
3/8 IN	15.54	15.98	2.29	76.67	23.33
1/4 IN	34.89	35.89	5.14	71.53	28.47
#4	34.89	35.89	5.14	66.39	33.61
#6	48.42	49.75	7.13	59.26	40.74
#8	48.42	49.75	7.13	52.13	47.87
#10	43.43	44.65	6.40	45.74	54.26
#14	60.93	62.63	8.97	36.77	63.23
#20	119.78	123.12	17.65	19.12	80.88
#30	56.98	58.61	8.40	10.72	89.28
#40	39.26	40.36	5.78	4.93	95.07
#50	24.53	25.22	3.61	1.32	98.68
#60	14.57	14.98	2.15	-0.83	100.83
#100	8.03	8.26	1.18	-2.01	102.01
#200	5.60	5.76	0.83	-2.83	102.83
<200 + W				0.0	100.00
TOTALS	566.98	698.12			

SPLITTING FACTOR 1.03
FINENESS MODULUS 4.30
% COBBLES 0.0 % PEBBLES 33.61 % GRANULES 13.39 % SAND 52.17 % SILT/CLAY 0.83

I N D U S T R I A L U S A G E A S S E S S M E N T

004532 01601E15SE00071A

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING MATERIAL ON SITE	REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4)
ASPHALT A (P. OF M.)	20.78	MARGINAL	YES	YES	YES		YES
ASPHALT B (P. OF M.)	13.72	MARGINAL	YES	YES	YES		YES
ASPHALT C (P. OF M.)	48.14	NOT SUIT					
BASE COURSE A (P. OF M.)	24.93	MARGINAL	YES	YES	YES		YES
BASE COURSE B (P. OF M.)	3.17	MARGINAL		YES			
BASE COURSE C (P. OF M.)	3.17	MARGINAL		YES			
SUB-BASE/BASE COURSE A (ASTM D1241)	37.53	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	7.63	MARGINAL		YES		YES	YES
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	55.78	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	10.63	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	5.01	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	15.83	MARGINAL	YES	YES			
TRAFFIC GRAVEL A (P. OF M.)	49.44	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	32.44	MARGINAL	YES	YES	YES		YES
TRAFFIC GRAVEL C (P. OF M.)	24.43	MARGINAL	YES		YES		YES
TRAFFIC GRAVEL D (P. OF M.)	24.43	MARGINAL	YES		YES		
SEAL COAT A (P. OF M.)	95.71	NOT SUIT					
SEAL COAT B (P. OF M.)	21.46	MARGINAL	YES		YES		YES
SEAL COAT C (P. OF M.)	0.0	SUITABLE	YES				
COARSE AGGREGATE 1 (ASTM C33-0448)	20.64	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33-0448)	19.64	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33-0448)	18.20	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33-0448)	17.86	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33-0448)	16.86	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33-0448)	16.75	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33-0448)	15.40	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33-0448)	15.43	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33-0448)	14.93	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33-0448)	14.93	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33-0448)	14.79	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33-0448)	14.79	NOT SUIT					
FINE CONCRETE AGGREGATE (P. OF M.)	5.64	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	7.41	MARGINAL	YES				
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	10.58	MARGINAL	YES				
MORTAR (ASTM C144)	8.09	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	5.48	MARGINAL	YES				
BUILT-UP ROOFS (ASTM D1863)	15.48	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	20.79	MARGINAL	YES		YES		YES
PITT RUN (P. OF M.)	0.0	SUITABLE					
SEPTIC FIELDS (U.M.A.)	13.54	MARGINAL				YES	
SHOULDERS (P. OF M.)	0.5	SUITABLE					

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 4

SAMPLE IDENTIFICATION 004533 01601E14SE00077A
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 1095.35 GMS. WASHED SAMPLE - WEIGHT BEFORE 555.73 AFTER 548.06 % LOSS 1.38

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		43.20	3.61	96.39	3.61
3/4 IN		59.89	5.00	91.39	8.61
5/8 IN	15.58	30.21	5.56	88.83	11.17
1/2 IN	13.22	30.21	5.56	83.28	16.72
3/8 IN	13.22	30.21	5.56	77.72	22.28
1/4 IN	13.22	66.64	5.56	72.16	27.84
#4	13.22	92.85	5.56	66.60	33.40
#8	19.75	78.38	6.54	60.07	39.93
#10	19.75	78.38	6.54	53.53	46.47
#16	19.75	122.38	10.24	43.29	56.71
#30	83.35	164.38	13.74	29.55	70.45
#40	46.97	91.99	7.69	21.86	78.14
#50	70.36	150.49	12.56	9.30	90.70
#80	91.78	179.24	15.00	4.55	95.45
#100	14.84	29.25	2.44	2.11	97.89
#200	4.40	8.67	0.72	1.39	98.61
<200 + W	8.43	16.62	1.39	0.0	100.00
TOTALS	555.73	1198.53			

SPLITTING FACTOR 1.97
FINENESS MODULUS 3.71
% COBBLES 0.0 % PEBBLES 27.40 % GRANULES 13.07 % SAND 58.14 % SILT/CLAY 1.39

INDUSTRIAL USAGE ASSESSMENT

004533 01601E14SE00077A

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* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *
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INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	CRUSHING REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4
ASPHALT A (P. OF M.)	24.78	MARGINAL	YES	YES	YES		YES
ASPHALT B (P. OF M.)	20.49	MARGINAL	YES	YES	YES		YES
ASPHALT C (P. OF M.)	31.16	NOT SUIT					
BASE COURSE A (P. OF M.)	31.16	NOT SUIT					
BASE COURSE B (P. OF M.)	3.61	MARGINAL		YES			
BASE COURSE C (P. OF M.)	3.61	MARGINAL		YES			
SUB-BASE/BASE COURSE A (ASTM D1241)	68.96	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	42.33	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	30.79	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	9.46	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	4.84	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	6.64	MARGINAL	YES	YES			
TRAFFIC GRAVEL A (P. OF M.)	55.28	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	30.58	NOT SUIT					
TRAFFIC GRAVEL C (P. OF M.)	12.27	MARGINAL	YES		YES		YES
TRAFFIC GRAVEL D (P. OF M.)	8.63	MARGINAL	YES		YES		YES
SEAL COAT A (P. OF M.)	97.65	NOT SUIT					
SEAL COAT B (P. OF M.)	96.80	NOT SUIT					
SEAL COAT C (P. OF M.)	19.08	MARGINAL	YES				YES
COARSE AGGREGATE 1 (ASTM C33;D448)	211.74	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33;D448)	201.78	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33;D448)	203.06	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33;D448)	203.06	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	150.65	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	150.65	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	43.09	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	191.74	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33;D448)	204.35	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	80.35	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	177.10	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	161.15	NOT SUIT					
COARSE AGGREGATE 68 (ASTM C33;D448)	161.44	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	132.37	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	132.37	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	146.02	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	146.02	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	111.64	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33;D448)	8.14	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (P. OF M.)	8.14	MARGINAL	YES				
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	8.14	MARGINAL	YES				
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	4.00	MARGINAL	YES				
MORTAR (ASTM C144)	4.00	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	9.14	MARGINAL	YES				YES
BUILT-UP ROOFS (ASTM D1863)	152.49	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	14.29	MARGINAL	YES		YES		YES
PIT RUN (P. OF M.)	0.14	SUITABLE					
SEPTIC FIELDS (U.M.A.)	21.29	MARGINAL				YES	
SHOULDERS (P. OF M.)	2.60	MARGINAL				YES	

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 4

SAMPLE IDENTIFICATION 004533 01601E27SE00083A

AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE

WEIGHT OF SAND 1214.58 GMS. WASHED SAMPLE - WEIGHT BEFORE 613.79 AFTER 613.79 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		285.18	15.95	84.05	15.95
1 1/2 IN		117.09	9.55	77.53	22.47
1 IN		139.06	9.18	75.35	24.65
3/4 IN		137.80	7.09	67.26	32.74
5/8 IN	37.75	74.70	4.16	63.18	36.82
1/2 IN	37.72	74.70	4.16	59.02	40.98
3/8 IN	37.72	74.70	4.16	54.86	45.14
1/4 IN	41.59	102.09	5.69	49.17	50.83
# 4	41.59	102.09	5.69	43.48	56.52
# 6	36.37	99.67	5.55	37.93	62.07
# 8	36.37	99.67	5.55	32.38	67.62
# 10	30.37	99.67	5.55	26.83	73.17
# 14	31.43	101.27	5.64	21.19	78.81
# 20	26.78	101.27	5.64	15.55	84.45
# 30	20.78	83.70	4.66	10.89	89.11
# 40	15.31	60.97	3.40	7.49	92.51
# 50	10.81	55.16	3.07	4.42	95.58
# 80	14.58	85.16	4.91	0.06	99.94
# 100	13.73	27.47	1.53	1.54	98.46
# 200	0.46	12.78	0.71	0.83	99.17
<200 + M	7.55	14.94	0.83	0.0	100.00
TOTALS	613.79	1794.71			

SPLITTING FACTOR 1.98

FINENESS MODULUS 5.65

% COBBLES 0.0 % PEBBLES 56.19 % GRANULES 11.11 % SAND 31.87 % SILT/CLAY 0.83

I N D U S T R I A L U S A G E A S S E S S M E N T

004533 01601E27SE00083A

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	CRUSHING REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4)
ASPHALT A (P. OF M.)	1.92	MARGINAL	YES	YES			
ASPHALT B (P. OF M.)	4.77	MARGINAL	YES	YES			
ASPHALT C (P. OF M.)	52.45	NOT SUIT					
BASE COURSE A (P. OF M.)	2.27	MARGINAL	YES	YES			
BASE COURSE B (P. OF M.)	3.29	MARGINAL	YES	YES			
BASE COURSE C (P. OF M.)	3.01	MARGINAL	YES	YES			
SUB-BASE/BASE COURSE A (ASTM D1241)	1.97	MARGINAL	YES	YES	YES		
SUB-BASE/BASE COURSE B (ASTM D1241)	2.40	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	2.90	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	12.81	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	6.01	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	45.27	NOT SUIT					
TRAFFIC GRAVEL A (P. OF M.)	14.83	MARGINAL	YES	YES	YES		YES
TRAFFIC GRAVEL B (P. OF M.)	8.77	MARGINAL	YES	YES			
TRAFFIC GRAVEL C (P. OF M.)	3.79	MARGINAL	YES				
TRAFFIC GRAVEL D (P. OF M.)	0.0	SUITABLE	YES				
SEAL COAT A (P. OF M.)	76.95	NOT SUIT					
SEAL COAT B (P. OF M.)	8.97	MARGINAL	YES		YES		YES
SEAL COAT C (P. OF M.)	0.0	SUITABLE	YES				
COARSE AGGREGATE 1 (ASTM C33;D448)	165.21	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33;D448)	155.26	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33;D448)	159.58	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33;D448)	156.18	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	160.48	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	162.46	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	90.06	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	165.10	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33;D448)	161.60	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	107.48	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	133.44	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	114.45	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	116.42	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	116.36	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	110.30	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	139.23	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	87.66	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33;D448)	63.87	NOT SUIT					YES
FINE CONCRETE AGGREGATE (P. OF M.)	11.34	MARGINAL	YES				
FINE CONCRETE AGGREGATE (ASTM C33; C404)	24.91	MARGINAL	YES				
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	7.68	MARGINAL	YES				
MORTAR (ASTM C144)	7.68	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	10.61	MARGINAL	YES				
BUILT-UP ROOFS (ASTM D1863)	115.85	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	0.0	SUITABLE	YES				
DIRT ROAD (P. OF M.)	0.0	SUITABLE	YES				
GRASS FIELDS (U.N.A.)	17.29	MARGINAL	YES		YES		
SHOULDERS (P. OF M.)	0.0	SUITABLE	YES				

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 3

SAMPLE IDENTIFICATION 004534 01601E23NE00086A

AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE

WEIGHT OF SAND 877.95 GMS. WASHED SAMPLE - WEIGHT BEFORE 875.76 AFTER 875.76 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		478.77	19.78	80.22	19.78
1 1/2 IN		526.58	21.76	58.45	41.54
1 IN		297.68	12.30	46.16	53.83
3/4 IN		239.33	9.89	36.27	63.73
5/8 IN	81.06	81.26	3.36	32.92	67.08
1/2 IN	81.06	81.26	3.36	29.56	70.44
3/8 IN	81.06	81.26	3.36	26.20	73.80
1/4 IN	68.50	68.67	2.84	23.36	76.64
# 4	68.50	68.97	2.84	20.53	79.47
# 8	63.07	63.23	2.61	17.91	82.09
# 10	63.06	63.22	2.61	15.30	84.70
# 16	61.37	61.86	2.56	12.73	87.25
# 30	116.57	116.86	4.83	7.90	92.09
# 40	54.96	55.00	2.27	5.63	94.35
# 50	45.61	45.72	1.89	3.76	96.24
# 80	56.46	56.60	2.34	1.42	98.55
# 100	10.85	10.88	0.45	0.97	99.03
# 200	9.26	9.28	0.38	0.59	99.41
<200 + W	14.13	14.17	0.59	0.0	100.00
TOTALS	875.76	2420.31			

SPLITTING FACTOR 1.00

FINENESS MODULUS 7.15

% COBBLES 0.0 % PEBBLES 79.47 % GRANULES 5.22 % SAND 14.72 % SILT/CLAY 0.59

INDUSTRIAL USAGE ASSESSMENT

004534 01601E23NE00086A

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <
ASPHALT A (P. OF M.)	4.64	MARGINAL	YES	YES			
ASPHALT B (P. OF M.)	0.39	MARGINAL	YES	YES			
ASPHALT C (P. OF M.)	53.01	NOT SUIT					
BASE COURSE A (P. OF M.)	9.39	MARGINAL	YES	YES			
BASE COURSE B (P. OF M.)	8.34	MARGINAL	YES	YES			
BASE COURSE C (P. OF M.)	3.27	MARGINAL	YES	YES			
SUB-BASE/BASE COURSE A (ASTM D1241)	3.93	MARGINAL	YES	YES			
SUB-BASE/BASE COURSE B (ASTM D1241)	42.97	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	6.50	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	35.13	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	9.89	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	71.69	NOT SUIT					
TRAFFIC GRAVEL A (P. OF M.)	6.39	MARGINAL	YES	YES			
TRAFFIC GRAVEL B (P. OF M.)	9.39	MARGINAL	YES	YES			
TRAFFIC GRAVEL C (P. OF M.)	20.39	MARGINAL	YES				
TRAFFIC GRAVEL D (P. OF M.)	11.42	MARGINAL	YES				
SEAL COAT A (P. OF M.)	76.75	NOT SUIT					
SEAL COAT B (P. OF M.)	4.10	MARGINAL	YES				YES
SEAL COAT C (P. OF M.)	0.0	SUITABLE	YES				
COARSE AGGREGATE 1 (ASTM C33;D448)	114.74	NOT SUIT					
COARSE AGGREGATE 1/2 (ASTM C33;D448)	124.95	NOT SUIT					
COARSE AGGREGATE 3/4 (ASTM C33;D448)	90.03	NOT SUIT					
COARSE AGGREGATE #3 (ASTM C33;D448)	65.50	NOT SUIT					
COARSE AGGREGATE #357 (ASTM C33;D448)	80.31	NOT SUIT					
COARSE AGGREGATE #4 (ASTM C33;D448)	77.52	NOT SUIT					
COARSE AGGREGATE #467 (ASTM C33;D448)	45.37	NOT SUIT					
COARSE AGGREGATE #5 (ASTM C33;D448)	98.47	NOT SUIT					
COARSE AGGREGATE #56 (ASTM C33;D448)	89.53	NOT SUIT					
COARSE AGGREGATE #57 (ASTM C33;D448)	99.78	NOT SUIT					
COARSE AGGREGATE #6 (ASTM C33;D448)	101.95	NOT SUIT					
COARSE AGGREGATE #67 (ASTM C33;D448)	81.72	NOT SUIT					
COARSE AGGREGATE #68 (ASTM C33;D448)	82.58	NOT SUIT					
COARSE AGGREGATE #7 (ASTM C33;D448)	97.33	NOT SUIT					
COARSE AGGREGATE #78 (ASTM C33;D448)	110.74	NOT SUIT					
COARSE AGGREGATE #8 (ASTM C33;D448)	129.42	NOT SUIT					
COARSE AGGREGATE #89 (ASTM C33;D448)	88.42	NOT SUIT					
COARSE AGGREGATE #9 (ASTM C33;D448)	84.38	NOT SUIT					
COARSE AGGREGATE #10 (ASTM C33;D448)	14.19	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (P. OF M.)	13.01	MARGINAL	YES				
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	29.64	MARGINAL	YES				
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	7.73	MARGINAL	YES				
TOPTAR (ASTM C143)	7.72	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	1.93	MARGINAL	YES				
BUILT-UP ROOFS (ASTM D1863)	99.85	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	1.42	MARGINAL	YES				
PIT RUN (P. OF M.)	0.0	SUITABLE	YES				
SEPTIC FIELDS (U.M.A.)	0.0	SUITABLE	YES				
SHOULDERS (P. OF M.)	0.0	SUITABLE	YES				

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 4

SAMPLE IDENTIFICATION 004542 01602E32SE00536
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 99.50 GMS. WASHED SAMPLE - WEIGHT BEFORE 99.50 AFTER 99.50 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		0.0	0.0	100.00	0.0
3/4 IN		0.50	0.50	99.50	0.50
5/8 IN	0.0	0.0	0.0	99.50	0.50
1/2 IN	0.0	0.0	0.0	99.50	0.50
3/8 IN	2.50	2.50	2.50	97.00	3.00
1/4 IN	4.20	4.20	4.40	92.80	7.20
#4	6.30	6.30	6.50	86.30	13.50
#8	21.90	21.90	22.90	64.50	35.40
#10	24.30	24.30	25.40	41.60	58.40
#16	37.30	37.30	39.30	24.30	75.70
#30	10.20	10.20	14.10	10.10	89.90
#40	7.00	7.00	7.10	3.10	92.90
#50	2.80	2.80	4.30	1.70	95.70
#80	1.20	1.20	1.20	0.50	97.90
#100	0.40	0.40	0.40	0.30	97.30
#200	0.40	0.40	0.40	0.0	97.70
<200 + W	2.30	2.30	2.30	0.0	100.00
TOTALS	99.50	100.00			

SPLITTING FACTOR 1.00
FINENESS MODULUS 4.07
% COBBLES 0.0 % PEBBLES 13.50 % GRANULES 24.90 % SAND 59.30 % SILT/CLAY 2.30

I N D U S T R I A L U S A G E A S S E S S M E N T

004542 01602E32SE00536

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	CRUSHING REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4)
ASPHALT A (P. OF M.)	39.20	NOT SUIT					
ASPHALT B (P. OF M.)	24.20	MARGINAL	YES		YES		YES
ASPHALT C (P. OF M.)	43.44	NOT SUIT					
BASE COURSE A (P. OF M.)	39.40	NOT SUIT					
BASE COURSE B (P. OF M.)	21.10	MARGINAL	YES	YES		YES	
BASE COURSE C (P. OF M.)	8.20	MARGINAL		YES		YES	
SUB-BASE/BASE COURSE A (ASTM D1241)	66.00	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	60.70	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	52.70	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	32.40	MARGINAL	YES	YES		YES	
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	17.60	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	14.60	MARGINAL	YES	YES			
TRAFFIC GRAVEL A (P. OF M.)	92.40	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	43.40	NOT SUIT					
TRAFFIC GRAVEL C (P. OF M.)	39.50	NOT SUIT					
TRAFFIC GRAVEL D (P. OF M.)	31.00	MARGINAL				YES	
SEAL COAT A (P. OF M.)	64.93	NOT SUIT					
SEAL COAT B (P. OF M.)	14.93	MARGINAL	YES		YES		
SEAL COAT C (P. OF M.)	0.0	SUITABLE	YES				
COARSE AGGREGATE 1 (ASTM C33;D448)	220.60	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33;D448)	210.60	NOT SUIT					
COARSE AGGREGATE 3A (ASTM C33;D448)	225.30	NOT SUIT					
COARSE AGGREGATE 3B (ASTM C33;D448)	210.00	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	202.30	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	189.30	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	179.90	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	167.50	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33;D448)	253.60	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	177.20	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	209.50	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	179.70	NOT SUIT					
COARSE AGGREGATE 68 (ASTM C33;D448)	169.00	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	160.10	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	142.85	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	132.85	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	84.89	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	43.33	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33;D448)	8.59	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (P. OF M.)	39.90	NOT SUIT					
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	80.60	NOT SUIT					
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	80.71	NOT SUIT					
MORTAR (ASTM C144)	19.97	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	39.80	NOT SUIT					
BUILT-UP ROOFS (ASTM D1863)	161.40	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	39.60	NOT SUIT					
PIT RUN (P. OF M.)	11.50	MARGINAL				YES	
SEPTIC FIELDS (U.S.D.A.)	13.50	MARGINAL				YES	
SHOULDERS (P. OF M.)	16.50	MARGINAL				YES	

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 6

SAMPLE IDENTIFICATION 004547 01702E02NW00100

AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE

WEIGHT OF SAND 887.60 GMS. WASHED SAMPLE - WEIGHT BEFORE 887.60 AFTER 875.60 % LOSS 1.35

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		449.40	33.61	66.39	33.61
1 1/2 IN		0.0	0.0	66.39	33.61
1 IN		0.0	0.0	66.39	33.61
3/4 IN		0.0	0.0	66.39	33.61
5/8 IN	33.50	33.50	2.51	63.88	36.12
1/2 IN	21.50	21.50	1.61	62.27	37.73
3/8 IN	54.40	54.40	4.07	60.45	39.55
1/4 IN	39.90	39.90	2.99	57.46	42.54
# 4	21.60	21.60	1.62	55.84	44.16
# 8	34.50	34.50	2.58	53.25	46.75
# 10	33.30	33.30	2.49	47.04	52.96
# 16	85.60	85.60	6.40	40.64	59.36
# 30	137.90	137.90	10.31	30.32	69.68
# 40	71.40	71.40	5.34	24.98	75.02
# 50	85.40	85.40	6.39	18.59	81.41
# 80	171.50	171.50	12.83	5.77	94.23
# 100	34.50	34.50	2.58	3.19	96.81
# 200	30.60	30.60	2.29	0.90	99.10
<200 + W	12.00	12.00	0.90	0.0	100.00
TOTALS	887.60	1337.00			

SPLITTING FACTOR 1.00

FINENESS MODULUS 5.09

% COBBLES 0.0 % PEBBLES 44.15 % GRANULES 8.81 % SAND 46.14 % SILT/CLAY 0.90

INDUSTRIAL USAGE ASSESSMENT

004547 01702E02NW00100

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING REQUIRED MATERIAL ON SITE	CRUSHING REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <
ASPHALT A (P. OF M.)	39.31	NOT SUIT					
ASPHALT B (P. OF M.)	39.43	NOT SUIT					
ASPHALT C (P. OF M.)	23.43	MARGINAL	YES	YES			
BASE COURSE A (P. OF M.)	44.29	NOT SUIT					
BASE COURSE B (P. OF M.)	20.26	MARGINAL	YES	YES	YES		YES
BASE COURSE C (P. OF M.)	6.77	MARGINAL	YES	YES	YES		
SUB-BASE/BASE COURSE A (ASTM D1241)	104.31	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	92.31	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	57.31	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	8.26	MARGINAL	YES	YES			YES
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	4.25	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	6.25	MARGINAL	YES	YES			
TRAFFIC GRAVEL A (P. OF M.)	66.06	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	63.06	NOT SUIT					
TRAFFIC GRAVEL C (P. OF M.)	39.41	NOT SUIT					
TRAFFIC GRAVEL D (P. OF M.)	26.26	MARGINAL	YES		YES		YES
SEAL COAT A (P. OF M.)	110.31	NOT SUIT					
SEAL COAT B (P. OF M.)	94.80	NOT SUIT					
SEAL COAT C (P. OF M.)	15.15	MARGINAL	YES				YES
COARSE AGGREGATE 1 (ASTM C33;D448)	192.43	NOT SUIT					
COARSE AGGREGATE 2 (ASTM C33;D448)	175.77	NOT SUIT					
COARSE AGGREGATE 24 (ASTM C33;D448)	170.05	NOT SUIT					
COARSE AGGREGATE 3 (ASTM C33;D448)	157.57	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33;D448)	211.74	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	196.51	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33;D448)	241.21	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	213.34	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33;D448)	235.34	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	177.89	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	164.34	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	180.14	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	166.35	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	160.14	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	169.34	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	169.31	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	194.77	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33;D448)	125.49	NOT SUIT					
FINE CONCRETE AGGREGATE (P. OF M.)	8.61	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	8.26	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	7.32	MARGINAL	YES				YES
MORTAR (ASTM C144)	6.35	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	15.93	MARGINAL	YES				YES
BUILT-UP ROOFS (ASTM D1863)	160.64	NOT SUIT					
AIRFIELD RUNWAYS (P. OF M.)	39.44	NOT SUIT					
CUT AND FILL (P. OF M.)	9.03	MARGINAL	YES		YES		
SEPTIC FIELDS (U.M.A.)	16.00	MARGINAL	YES		YES		
SHOULDERS (P. OF M.)	14.13	MARGINAL	YES		YES		

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 5

SAMPLE IDENTIFICATION 004548 01702E02NE00104A
AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE
WEIGHT OF SAND 1006.03 GMS. WASHED SAMPLE - WEIGHT BEFORE 251.56 AFTER 251.56 % LOSS 0.0

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		70.60	6.56	93.44	6.56
3/4 IN		0.0	0.0	93.44	6.56
5/8 IN	7.01	20.03	1.90	91.54	8.46
1/2 IN	7.01	33.03	3.00	88.54	11.46
3/8 IN	7.01	33.03	3.00	85.53	14.47
1/4 IN	19.28	77.10	7.16	78.37	21.63
# 4	19.28	77.10	7.16	71.21	28.79
# 6	31.60	66.70	6.05	65.16	34.84
# 8	31.60	66.70	6.05	59.10	40.90
# 10	34.58	28.70	2.65	56.45	43.55
# 16	34.58	69.11	6.41	50.04	49.96
# 30	39.39	117.01	10.87	39.17	60.83
# 40	42.00	47.99	4.46	34.72	65.28
# 50	42.98	56.99	5.29	29.43	70.57
# 80	42.56	128.97	11.98	17.45	82.55
# 100	18.00	71.98	6.69	10.76	89.24
# 200	21.59	69.34	6.05	4.71	95.29
<200 + W	3.97	15.68	1.47	0.0	100.00
TOTALS	251.56	1076.63			

SPLITTING FACTOR 4.00
FINENESS MODULUS 3.62
% COBBLES 0.0 % PEBBLES 28.69 % GRANULES 16.11 % SAND 53.73 % SILT/CLAY 1.47

INDUSTRIAL USAGE ASSESSMENT

004548 01702E02NE00104A

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING MATERIAL ON SITE	REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <#4)
ASPHALT A (P. OF M.)	10.25	MARGINAL	YES	YES	YES		YES
ASPHALT B (P. OF M.)	11.01	MARGINAL	YES	YES	YES		YES
ASPHALT C (P. OF M.)	20.31	MARGINAL	YES	YES	YES		YES
BASE COURSE A (P. OF M.)	22.84	MARGINAL	YES	YES			
BASE COURSE B (P. OF M.)	5.53	MARGINAL		YES			
BASE COURSE C (P. OF M.)	4.72	MARGINAL		YES			
SUB-BASE/BASE COURSE A (ASTM D1241)	40.72	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	59.28	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	54.26	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	9.53	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	4.43	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	4.02	MARGINAL	YES	YES			
TRAFFIC GRAVEL A (P. OF M.)	47.04	NOT SUIT					
TRAFFIC GRAVEL B (P. OF M.)	18.04	MARGINAL	YES	YES	YES		YES
TRAFFIC GRAVEL C (P. OF M.)	15.01	MARGINAL	YES		YES		YES
TRAFFIC GRAVEL D (P. OF M.)	13.11	MARGINAL	YES		YES		YES
SEAL COAT A (P. OF M.)	87.75	NOT SUIT					
SEAL COAT B (P. OF M.)	33.77	NOT SUIT					
SEAL COAT C (P. OF M.)	19.01	MARGINAL	YES				YES
COARSE AGGREGATE 1 (ASTM C33-0448)	241.05	NOT SUIT					
COARSE AGGREGATE 1 (ASTM C33-0448)	209.05	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33-0448)	192.15	NOT SUIT					
COARSE AGGREGATE 357 (ASTM C33-0448)	148.46	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33-0448)	197.66	NOT SUIT					
COARSE AGGREGATE 467 (ASTM C33-0448)	145.86	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33-0448)	209.08	NOT SUIT					
COARSE AGGREGATE 56 (ASTM C33-0448)	209.03	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33-0448)	167.96	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33-0448)	183.21	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33-0448)	183.21	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33-0448)	183.43	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33-0448)	183.23	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33-0448)	173.43	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33-0448)	161.46	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33-0448)	112.17	NOT SUIT					
COARSE AGGREGATE 11 (ASTM C33-0448)	9.44	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (P. OF M.)	9.91	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE I (ASTM C33; C404)	21.63	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE II (ASTM C33; C404)	10.76	MARGINAL	YES				
MORTAR (ASTM C144)	2.40	MARGINAL	YES				YES
PORTLAND CEMENT (P.C.A.)	22.72	NOT SUIT					YES
BUILT-UP ROOFS (ASTM D1863)	12.72	NOT SUIT			YES		
ATOFIELD RUNWAYS (P. OF M.)	18.03	MARGINAL	YES				
BITUMEN (P. OF M.)	0.0	SUITABLE				YES	
SEPTIC FIELDS (U.M.A.)	23.44	MARGINAL				YES	
SHOULDERS (P. OF M.)	1.31	MARGINAL					

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 4

SAMPLE IDENTIFICATION 004554 01702E17SE00094

AVAILABILITY OF CRUSHABLE MATERIAL ON SITE - NONE

WEIGHT OF SAND 1240.50 GMS. WASHED SAMPLE - WEIGHT BEFORE 1240.50 AFTER 1198.50 % LOSS 3.39

SIEVE SIZE	FINE FRACTION (GMS.)	SIEVE WEIGHTS (GMS.)	PERCENT	PERCENT PASSING	PERCENT RETAINED
4 IN		0.0	0.0	100.00	0.0
3 1/2 IN		0.0	0.0	100.00	0.0
3 IN		0.0	0.0	100.00	0.0
2 1/2 IN		0.0	0.0	100.00	0.0
2 IN		0.0	0.0	100.00	0.0
1 1/2 IN		0.0	0.0	100.00	0.0
1 IN		0.0	0.0	100.00	0.0
3/4 IN		23.50	1.86	98.14	1.86
1/2 IN	17.50	17.50	1.38	96.76	1.38
3/8 IN	11.00	28.50	2.26	94.49	2.26
#4	45.00	73.50	5.82	88.68	5.82
#8	165.00	165.00	13.04	75.64	13.04
#16	178.80	178.80	14.13	61.51	14.13
#30	224.30	224.30	17.73	43.78	17.73
#40	64.00	64.00	5.06	38.72	5.06
#50	198.10	198.10	15.67	23.05	15.67
#80	257.90	257.90	20.40	2.65	20.40
#100	30.50	30.50	2.41	0.24	2.41
#200	15.40	15.40	1.22	0.02	1.22
<200 + W	42.00	41.20	3.26	0.0	3.32
TOTALS	1240.50	1264.00			

SPLITTING FACTOR 1.00

FINENESS MODULUS 4.30

% COBBLES 0.0 % PEBBLES 29.44 % GRANULES 22.81 % SAND 44.43 % SILT/CLAY 3.32

INDUSTRIAL USAGE ASSESSMENT

004554 01702E17SE00094

* NOTE - SUITABILITY OF SAMPLE IS BASED ONLY ON GRADING SPECIFICATIONS *

INDUSTRIAL USE	TOTAL RESIDUAL	RATING	SCREENING REQUIRED	REMOVAL OF <#200 MATERIAL	CRUSHING MATERIAL ON SITE	REQUIRED MATERIAL NOT ON SITE	ADDITION OF FINES (MATERIAL <
ASPHALT A (P. OF M.)	8.97	MARGINAL	YES		YES		
ASPHALT B (P. OF M.)	9.52	MARGINAL	YES				
ASPHALT C (P. OF M.)	54.48	NOT SUIT					
BASE COURSE A (P. OF M.)	12.03	MARGINAL	YES	YES	YES		
BASE COURSE B (P. OF M.)	9.52	MARGINAL	YES	YES			
BASE COURSE C (P. OF M.)	0.00	MARGINAL		YES			
SUB-BASE/BASE COURSE A (ASTM D1241)	48.06	NOT SUIT					
SUB-BASE/BASE COURSE B (ASTM D1241)	40.54	NOT SUIT					
SUB-BASE/BASE/SURFACE COURSE C (ASTM D1241)	17.78	MARGINAL	YES	YES		YES	
SUB-BASE/BASE/SURFACE COURSE D (ASTM D1241)	10.57	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE E (ASTM D1241)	12.57	MARGINAL	YES	YES			
SUB-BASE/BASE/SURFACE COURSE F (ASTM D1241)	42.62	NOT SUIT					
TRAFFIC GRAVEL A (P. OF M.)	39.46	MARGINAL	YES	YES	YES		YES
TRAFFIC GRAVEL B (P. OF M.)	13.65	MARGINAL	YES	YES	YES		
TRAFFIC GRAVEL C (P. OF M.)	4.38	MARGINAL	YES			YES	
SEAL COAT A (P. OF M.)	0.00	MARGINAL				YES	
SEAL COAT B (P. OF M.)	72.38	NOT SUIT					
SEAL COAT C (P. OF M.)	0.00	MARGINAL	YES		YES		
COARSE AGGREGATE 1 (ASTM C33;D448)	220.46	SUITABLE	YES				
COARSE AGGREGATE 2 (ASTM C33;D448)	210.42	NOT SUIT					
COARSE AGGREGATE 4 (ASTM C33;D448)	220.48	NOT SUIT					
COARSE AGGREGATE 5 (ASTM C33;D448)	207.31	NOT SUIT					
COARSE AGGREGATE 57 (ASTM C33;D448)	192.00	NOT SUIT					
COARSE AGGREGATE 6 (ASTM C33;D448)	183.83	NOT SUIT					
COARSE AGGREGATE 67 (ASTM C33;D448)	182.34	NOT SUIT					
COARSE AGGREGATE 7 (ASTM C33;D448)	175.61	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	215.87	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	145.69	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	182.73	NOT SUIT					
COARSE AGGREGATE 10 (ASTM C33;D448)	145.58	NOT SUIT					
COARSE AGGREGATE 11 (ASTM C33;D448)	145.62	NOT SUIT					
COARSE AGGREGATE 78 (ASTM C33;D448)	147.02	NOT SUIT					
COARSE AGGREGATE 8 (ASTM C33;D448)	132.15	NOT SUIT					
COARSE AGGREGATE 89 (ASTM C33;D448)	98.41	NOT SUIT					
COARSE AGGREGATE 9 (ASTM C33;D448)	66.44	NOT SUIT					
FINE CONCRETE AGGREGATE (P. OF M.)	0.64	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE (ASTM C33; C404)	0.00	MARGINAL	YES				YES
FINE CONCRETE AGGREGATE 2 (ASTM C33; C404)	52.20	NOT SUIT					
MORTAR (ASTM C144)	20.00	MARGINAL	YES				
PORTLAND CEMENT (P.C.A.)	53.38	NOT SUIT					
ROLL-UP ROOFS (ASTM D1863)	130.15	NOT SUIT					
AVAT FIELD RUNWAYS (P. OF M.)	0.41	MARGINAL				YES	
SEPTIC FIELDS (U.M.A.)	0.0	SUITABLE					
SHOULDERS (P. OF M.)	28.54	MARGINAL				YES	
	0.56	MARGINAL				YES	

OVERALL SAMPLE RATING (SCALE 1 - 9) IS 4

APPENDIX II

POLICY #13

ECONOMICALLY VALUABLE AGGREGATE AND QUARRY MINERAL DEPOSITS SHOULD BE PROTECTED FROM SURFACE LAND USES THAT WOULD INTERFERE WITH THEIR ONGOING AND FUTURE EXPLOITATION.

A. Policy Objectives

The objectives of this Policy are:

(a) To protect aggregate and quarry mineral resources for future construction and development in the Province.
(b) To ensure that materials are available to support local and provincial construction needs and industrial minerals production at a reasonable cost.
(c) To ensure that pit and quarry operations are reasonably compatible with adjacent land uses.
(d) To integrate aggregate and quarry mineral extraction into the overall land use planning process by allocating areas specifically for extraction and by assuming that as the economic climate changes so areas allocated to resource extraction will also change.
(e) To pursue sequential land use practices such that on a known deposit (i) a non-conflicting land use is applied to the surface of the deposit prior to mineral extraction, and (ii) the land is returned to a practical and compatible use once extraction has ceased.

B. Policy Application

Deposits of sand and gravel and near-surface limestone which are in demand as construction materials by industry, local communities or government departments and agencies, should be protected. In certain parts of the Province such minerals as bentonite, shale, gypsum, high calcium limestone, silica sand and other quarry minerals should also be protected to ensure a supply of these materials to industrial mineral related industries. These include both surface deposits and shallow subsurface deposits overlain by till or clay.

For the purpose of this Policy:

(a) Conflicting land uses include residential subdivision lots, highways or utility corridors. Such development should be deferred until the mineral is extracted and the site rehabilitated.
(b) Marginally conflicting land uses include the incorporation of aggregate and quarry mineral deposits into a Provincial or National Park, a Wildlife Management Area, a Community Pasture or a Provincial Forest or the establishment of a garbage dump on part of a deposit. In these cases, mineral extraction can take place alongside the alternative land use, provided that agreement is reached between the two concerns, to ensure optimal utilization of all resources involved.
(c) Non-conflicting land uses include recreation outside of Provincial Parks, low value timber stands, general agricultural practices and temporary occupation, such as trailer parks or parking lots. Pit and quarry operations can develop in these areas whenever such activities become economically feasible.

In some areas aggregate or quarry mineral extraction should be recognized as a primary land use. In other areas a marginal or non-conflicting land use may be permitted providing that it could later be converted to a gravel or mineral extraction operation.

In order to indicate areas where conflicting land uses should be disallowed, the Mineral Resources Division is in the process of producing aggregate and quarry mineral resource maps for certain regions of the Province. These will take the form of "Stop – Caution – Go" maps. "Stop" indicates valuable deposits upon which no conflicting land use should be allowed. "Caution" denotes a deposit whose full potential is not proven or whose quality is not high but which has been recognized as of value to the region. Deposits with a status of "Caution" may be designated for a conflicting land use, after local needs have been scrutinized. "Go" denotes a deposit of no present recognized value as an aggregate or quarry mineral source. Periodic revision to the "Stop – Caution – Go" status of deposits will reflect continuing exploration and changing economic

conditions. It is understood that the maps will be subject to approval by the Provincial Land Use Committee.

The rehabilitation of pits and quarries on both Crown and private land is governed by Regulation under The Mines Act. The rehabilitation takes place in accordance with an approved plan. Concensus for the plan is derived from concerned Municipal and Provincial agencies. The Mineral Resources Division requires such plans from all commercial operators.

Following mineral exploitation and rehabilitation, the land can be restored to some compatible use.

C. Definitions

For the purpose of this Policy:

(a) "Aggregate" means sand, gravel, or both, or crushed rock.

(b) "Economically Valuable Aggregate and Quarry Mineral Deposits" means those areas of aggregate and quarry mineral resource which have a high potential for extraction based on supply and demand projected over 25 years.

(c) "Quarry Minerals" means those minerals obtained by quarrying, including shale, kaolin, bentonite, gypsum, clay, silica-rich sand, peat, salt, coal, and rock or stone used for any purpose other than as a source of metal, asbestos, potash, oil and natural gas.

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